



UNION OF SOUTH AFRICA

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# ANNUAL REPORT

OF THE

## Department of Public Health

YEAR ENDED 30th JUNE, 1933

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*PUBLISHED BY AUTHORITY*

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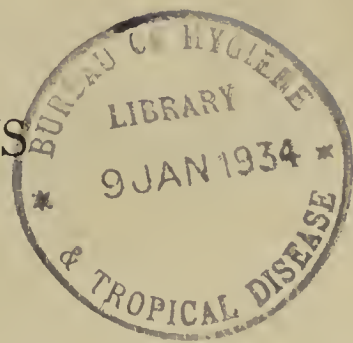
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# DEPARTMENT OF PUBLIC HEALTH

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## Department of Public Health.

### Report for the Year Ended 30th June, 1933.

TO THE HONOURABLE THE MINISTER OF PUBLIC HEALTH,  
PRETORIA.

I have the honour to submit herewith the report of the Department of Public Health for the year ended 30th June, 1933.

#### I.—INTRODUCTORY.

The health year ended 30th June, 1933, has been relatively quiet and uneventful. There have been no severe prevalences or epidemics of infectious or preventable disease, although malaria has only been prevented with difficulty from assuming epidemic proportions in certain districts of Natal. Plague has given rise to some anxiety in the Orange Free State where several human cases have occurred in certain areas owing to wild rodents having bred up and become infected, and there has been some further spread elsewhere of enzootic infection in wild rodents.

Unquestionably the long period of financial depression must have had prejudicial effects on the health of the Union, but it is impossible as yet to gauge the extent of the damage that has been done. The poorer sections of the community, particularly in the drought-stricken areas and even in some of the larger towns have been in acute want. Indeed numbers of children have had to go for long periods without proper food and in many cases milk has been entirely lacking from their dietaries.

The health budgets of local authorities—generally already inadequate properly to safeguard the public health—have been cut down, and the greatest difficulty has been experienced by the Department in preventing in some local authority areas the retrenchment of essential medical and sanitary personnel. It has been fortunate indeed that there has been no severe prevalence of infectious or preventable diseases during the period for the weakened health organizations resulting from an unwise reduction in health expenditure in many areas might not have stood up to the strain.

As it was, great difficulty has been experienced in inducing some local authorities to take even the essential measures required to deal with threatened outbreaks of infectious disease. This in a large measure has been due to the reduction of forty per cent. made in the refunds granted under the Public Health Acts to local authorities for dealing with infectious diseases. The reduction was effected for a period of one year by Act No. 25 of 1932. This matter was considered by the Council of Public Health in December last, when the following resolution was passed :—

“ This Council is of opinion that further reductions of part-refunds of expenditure to local authorities will have a grave effect on public health and must at all costs be prevented, more especially in times of depression. The Council also views with apprehension the effects likely to result from the last reduction.”

Fortunately, the Government has been able to restore the refunds for the current financial year, although a limitation of £10,000 has been placed on the total amount which may be refunded by the Central Government to any local authority in any one financial year. This, in effect, only applies to the Municipalities of Capetown and Johannesburg.

The budgets of the Department itself for the current and past few financial years, as approved by Parliament, were as follows :—

For 1929-30.....	£491,473
„ 1930-31.....	478,761
„ 1931-32.....	453,062
„ 1932-33.....	397,072
„ 1933-34.....	408,597

With the exception of the saving resulting from the closure of Robben Island as a Leper Institution in 1931, amounting to about £25,000, and the reductions effected in the emoluments of departmental officers in 1931 and 1932, the economies effected in the votes of the Department have exercised a strangle-hold on all public health progress in recent years—except in regard to dealing with Malaria, where the public conscience was sufficiently roused by recurring outbreaks of a severe type to ensure the provision of essential staff for supervision and research.

But in every other respect the Department has been severely crippled by the financial depression. Insufficient money has been provided for its itinerant officers to visit local authorities except when urgently required and it has consequently had to curtail much of its real preventive work. Part-time district surgeons in many cases are being paid insufficiently for the services they are being called upon to render particularly in a time of depression when the number of necessitous people that are placed as free patients



upon their visiting lists by magistrates is enormously increased. Further, the reduction in the refunds to local authorities amounting to £28,400 has, it is feared, generally undermined temporarily the efficiency of local health services except in a few of the larger towns in the Union, and during the period under review there was a hesitancy or refusal that did not exist previously on the part of some of the smaller local authorities to incur promptly necessary expenditure on dealing with outbreaks of infectious disease. Even the publicity vote of the Department which formerly stood at £500 only has been reduced to a token item of £25 on the estimates for the last two years.

The main functions of the Department are laid down in section 3 of the Public Health Act, Act No. 36 of 1919, as follows:—

“ . . . to prevent or guard against the introduction of infectious disease into the Union from outside ; to promote the public health and the prevention, limitation or suppression of infectious, communicable or preventable diseases within the Union ; to advise and assist provincial administrations and local authorities in regard to matters affecting the public health ; to promote or carry out researches and investigations in connection with the prevention or treatment of human diseases ; to prepare and publish reports and statistical or other information relative to the public health, and generally to carry out in accordance with directions the powers and duties in relation to the public health, conferred or imposed on the Governor-General or the Minister by this Act or otherwise.”

These functions cannot, in my opinion, be properly fulfilled without returning at least to a level of expenditure considered necessary for health purposes in 1929–30. It is of course useless for demands to be made on the Department by the public as have been done recently for the provision of more adequate medical and nursing services or for an expansion of the existing service whether for the reduction in maternal mortality or otherwise, unless further funds can be provided by Parliament. To a large extent the Department has always had to make bricks without straw, and the Council of Public Health viewed with apprehension the fact that the Department's vote had steadily diminished in recent years in spite of the fact that considerable new expenditure in connection with such matters as the combating of Malaria had had to be provided for ; at the meeting held on 7th December, 1932, the following resolution was passed:—

“ The provision for expenditure on Public Health has always been on an inadequate scale as compared with that of other Departments. The reduction in this expenditure can only be viewed with grave concern. This Council is of opinion that this point must be stressed and brought to the notice of the Minister and the Cabinet.”

Hitherto, the chief interest—in fact, one may almost say, the sole interest—in public health in South Africa has been centred on the environment ; that is to say, the public has concerned itself almost entirely with the prevention and control of communicable diseases through the disposal and treatment of excremental matter, rubbish removals, water purification, the safeguarding of milk supplies and foodstuffs, the eradication of disease-carrying insects, and improvement in the housing condition of the people.

In none of our urban centres have all these matters reached a reasonably satisfactory level ; even in Capetown which, in the main, sets a high standard in other respects, there are still housing conditions that are a disgrace to South Africa. Outside the few large towns, public health administrators are still battling to a large extent with ignorance and apathy in order to establish reasonably healthy environments. During the last thirty years much has been accomplished in improving the environment, but on the whole one must admit that progress has been disappointingly slow.

And progress has been slow because the individual citizen has not been properly educated in personal and community hygiene. It seems to me doubtful whether much improvement can be effected in South Africa until the public are made to realise that—while they must of necessity be vitally concerned with the safeguarding of the routes along which communicable diseases travel and are disseminated and with other matters pertaining to the environment in its relation to disease—they must be chiefly interested in the *human being*. What is required is for the public to understand the necessity for the building up of vigorous harmoniously developed bodies free from incapacitating defects and illnesses. To ensure this the masses must be taught the fundamentals of health promotion and the prevention and control of communicable and other diseases. In these matters it is useless to think, as some people do, that we can deal effectively with the problem by means of legislation and regulations alone. This is simply not possible, but it can be done by *education* and, if we are to progress in South Africa and to build up a healthy nation, it seems to me that public health workers must concentrate more and more on the human being than on the environment.

A former Prime Minister of the United Kingdom made the statement in the House of Commons more than 50 years ago that “ public health is the foundation on which repose the happiness of the people and the power of the country. The care of the public health is the first duty of a statesman.” If this be true, then it would seem that the State has a duty at least to ensure that its citizens have an education which is concerned with the fundamentals of health promotion and personal and community hygiene. At present it cannot be said that this is the case in South Africa where the education of the masses in the fundamentals of right living has hardly been attempted except in connection with the cadet movement. Cadet officers—who are practically all schoolmasters—are brought up to the Military College at Roberts Heights by the Defence Department



periodically for courses of military instruction. The Director of Medical Services has been able to ensure that military hygiene figures very largely in the curriculum of these courses, and the Department is satisfied that the public health instruction given at these courses has been of great value to the country as a whole perhaps more than almost any other single health measure instituted by the Government.

Surely it must be along these lines that we can hope for a more rapid advancement in public health, but first we must secure the sympathy and assistance of the Universities and of the Provincial Departments of Education to a greater extent than has been possible up to the present. A commencement would have to be made in supplementing the instruction given to our future teachers at the Universities and at the Normal Colleges. Such instruction it seems to me should always be given by qualified medical men and when possible by medical men who are specialists in public health. Then and not till then shall we reach a stage where those entrusted with the teaching of the young will be in a position themselves to deal properly with the subject, and provision could then be made in the school curricula with some certainty that the subject would be taught on right lines. Methods and materials in health teaching, psychologically and pedagogically sound, would doubtless have to be developed with a view of acquainting the child with the fundamentals of health and so as to develop in it a knowledge of and desire for healthy living. Once this is arranged, it would be possible to supplement the public health education of the masses at no great cost by effective journalism supplemented by public lectures, films and other procedures utilized in the public health education of adults. But even the latter cannot be effected with the funds which have been provided on the current estimates of the Department.

Many thinking men realise keenly and impatiently the social lag in matters pertaining to public health, but with an apathetic public they do not bestir themselves to remedy it. The first and cheapest line of attack must be insisting upon the schools taking their proper place in promoting the health of South Africa. They are only making a pretence of it at present.

There are many matters connected with the public health of the Union at the present time which demand attention.

The question of a simpler and better co-ordinated organization for administering and dealing with, on a broad national basis, local government, school medical matters, sanitation, housing, hospitals, and the midwifery and nursing needs of the people, will doubtless be studied by the Provincial Commission now engaged in taking evidence and need not be specially referred to here.

But there are certain urgent departmental requirements that should be taken in hand at once. These may be stated to be the following:—

- (a) An extension of the District Surgeon's system and more adequate remuneration for many of the existing district surgeons, whose work has been greatly increased in recent years by the prevailing distress, particularly in rural areas, without any corresponding increase in emoluments. About 20 new appointments should be made, many more rural tours should be arranged, and the emoluments of existing officers should be adjusted.
- (b) The appointment of a medical officer, preferably a woman, to study problems connected with maternal and infant welfare in the Union, together with the appointment of at least three nurse-lecturers to assist in educating rural mothers—with the object, ultimately, of establishing a district nursing service throughout South Africa.
- (c) The provision of sufficient funds to enable more health, publicity and educative work to be undertaken for the dissemination of knowledge of the simple principles of healthy living, and the causes, prevention and early recognition of diseases amongst all races and classes of the population, including school children.
- (d) The provision of funds for the assay of therapeutic substances such as the drugs: digitalis, strophanthus, ergot, arsphenamine, neo-arsphenamine, sulpharsphenamine; the endocrine products: insulin, thyroxin, adrenalin, pituitrin; the vitamins, particularly the anti-rachitic vitamin; sera; and vaccines.
- (e) The provision of increased bed accommodation and other facilities at the Sanatorium at Nelspoort, as an instalment of a still larger scheme to provide ultimately for 250 to 300 beds at this institution, as part of a comprehensive national scheme for dealing with tuberculosis in the Union.
- (f) The provision of additional funds—whether for subsidizing under the Public Health Act local authorities or provincial administrations or otherwise—for the hospitalization of necessitous cases of advanced tuberculosis, who cannot adequately be dealt with in their own homes, and for subsidizing tuberculosis clinics.
- (g) The provision of funds for subsidizing malaria committees in rural areas in Natal, for the purpose of enabling such committees to employ satisfactory executive anti-malaria staffs.
- (h) The provision of additional inspectors for supervising anti-malaria work in local authority areas and in Native Reserves and locations.
- (i) The provision of funds and facilities for the training and employment of native subordinate staff, male and female, for health, medical and nursing work in Native Reserves and locations.

The most urgent needs in local authority areas may be summarised as follows :—

- (a) In the large towns—the provision of additional houses, particularly for the needs of the poorer sections of the community, and generally for dealing with overcrowding and unhealthy areas.
- (b) In smaller towns of any considerable size—the appointment of whole-time medical officers of health, if necessary, in co-operation with the Government under section 17 of the Public Health Act, by the amalgamation of existing part-time medical appointments and the establishment of clinics in connection with maternal and infant welfare as well as for Tuberculosis and Venereal Diseases.
- (c) In small towns and villages—the appointment of qualified health inspectors in lieu of untrained personnel.
- (d) More attention generally to the disposal of night-soil, refuse and manure (especially horse manure), and the prevention of fly-breeding in most urban centres and on farms.
- (e) Better supervision of dairies and the elimination of typhoid “carriers” from dairies and other places in which milk and foodstuffs are handled.

## II.—VITAL STATISTICS.

The following table summarizes the salient features of the vital statistics of the European population for each calendar year since 1920 :—



TABLE A.—UNION OF SOUTH AFRICA: SUMMARY OF VITAL STATISTICS OF EUROPEAN POPULATION, 1920-1932.

Calendar Year.	European Population (estimated).	Birth Rate per 1,000 of Population.	Death Rate per 1,000 of Population.		Death Rate per 100,000 of Population from				Percentage of Total Deaths, the Cause of which was Medically Certified.	Infantile Mortality Rate (Deaths of Infants under One Year per 1,000 Live Births Registered).	Maternal Mortality Rate (Deaths of Mothers in connection with Pregnancy or Childbirth per 1,000 Live Births Registered.)	Survival Rate or Rate of Natural Increase (Excess of Births over Deaths per 1,000 of Population).
			Death Rate per 1,000 of Population.		Death Rate per 100,000 of Population from							
			Actual or Crude.	Standardized.*	Diseases of Heart and Circulatory System.	Pneumonia and Bronchitis.	Cancer.	Tuberculosis (all forms).§				
1920.....	1,499,911	28.97	11.09	12.15	95.67†	113.87†	58.94†	46.00†	79.78	90.07	4.10†	17.88
1921.....	1,519,488†	28.44	10.41	11.43	102.91	136.15	69.09	58.26	80.76	77.09	4.94	18.03
1922.....	1,556,241	27.52	9.48	10.41	97.99	127.24	70.88	47.74	82.96	72.91	5.21	18.04
1923.....	1,579,733	26.70	9.77	10.65	108.50	120.72	78.94	46.46	82.77	74.42	5.22	16.93
1924.....	1,610,774	26.29	9.62	10.44	123.92	123.79	76.36	51.59	84.74	73.73	4.75	16.67
1925.....	1,637,472	26.51	9.39	10.15	128.86	97.04	72.86	52.70	86.45	68.39	5.62	17.12
1926.....	1,676,660†	26.16	9.59	10.28	127.21	113.44	71.18	53.41	87.76	64.82	4.56	16.57
1927.....	1,708,955	25.95	9.73	10.34	122.76	110.42	73.20	50.50	89.93	70.62	4.80	16.22
1928.....	1,738,937	25.77	10.15	10.69	133.53	127.72	77.52	50.95	89.93	70.49	4.98	15.62
1929.....	1,767,719	26.15	9.51	9.98	127.11	104.04	77.44	45.37	90.19	64.22	5.26	16.64
1930.....	1,797,900	26.44	9.69	10.08	132.33	112.87	82.62	46.76	91.15	66.84	5.26	16.75
1931.....	1,829,300	25.38	9.37	9.56	131.53	103.75	85.55	44.22	90.46	63.07	4.70	16.01
1932.....	1,859,400	24.17	9.97		137.52	113.75	89.06	42.33	90.84	68.57	5.34	14.20

\* The rate which would have obtained had the age and sex distribution of the population been the same as that of England and Wales at the 1901 census, the standard usually taken for international comparisons.  
† Medically certified deaths only. Rates for subsequent years calculated on total deaths registered.  
‡ Actual (per census).  
§ Includes Miners' Phthisis combined with Pulmonary Tuberculosis.  
|| Figures not yet available.

The birth rate, 24·17 shows a striking fall; it is the lowest yet recorded for the Union, and is 1·77 lower than the average for the previous five years. On the other hand, the death rate increased from 9·37 in 1931 to 9·97 in 1932, which is 0·28 above the average for the last five years. The infantile mortality rate also rose, from 63 to 68, and is thus slightly above the average for the last five years, which is 66 per thousand. The increased death rates, particularly those of infants, must be associated with the conditions of economic stress and the definite privations to which a large section of the community has been subjected.

The following information and comparisons in respect of Europeans with other countries, supplied by the Director of Census and Statistics, are of special interest:—

*Population of the Union—Estimates as at 30th June, 1932.*—European, 1,859,400; non-European, Bantu, 5,600,300; Asiatic, 193,900; mixed and other coloured, 597,300; total non-European, 6,391,500. The European estimates are calculated on the average annual increases between the two last census, together with the annual records of births, deaths and migration. The non-European estimates are based on the 1921 census, and the average annual increase between 1911 and 1921.

*Birth Rates.*—Union of South Africa, 24·17; Portugal, 30·6; Greece, 30·1; Bulgaria, 31·2; Lithuania, 27·1; Italy, 25·7; Canada, 23·7; Australia, 19·5; U.S.A., 19·8; New Zealand, 18·7; France, 17·7; Germany, 17·1; England and Wales, 16·1; Holland, 22·7.

*Death Rates.*—Union of South Africa, 9·97; Australia, 9·0; New Zealand, 8·6; Germany, 11·6; England and Wales, 12·4; Belgium, 13·9; Italy, 15·0; France, 14·7; Lithuania, 16·2; U.S.A., 11·8; Portugal, 17·6; Canada, 10·8; Holland, 9·8.

*Infantile Mortality Rates.*—Union of South Africa, 68; New Zealand, 34; Australia, 47; Holland, 53; England and Wales, 67; France, 83; Germany, 89; Canada, 89; Belgium, 95; Italy, 122; Portugal, 148; Lithuania, 159.

*Survival Rate or Rate of Natural Increase.*—Union of South Africa, 14·20; Portugal, 13·0; Holland, 12·9; Canada, 12·9; Italy, 10·7; Australia, 10·5; New Zealand, 10·1; U.S.A., 8·0; Germany, 5·1; England and Wales, 3·7; France, 3·0.

It will be seen from the above table that only essential information for 1932 has been made available in respect of European deaths. There is a real need in South Africa for the preparation of vital statistics affecting all races and not merely Europeans only. Notification of non-European births and deaths is compulsory only in urban areas, and in many of these, owing to the large proportion of non-European male adults temporarily resident as labourers and to other circumstances, computations of death rates and similar statistics are useless or misleading.

It is greatly to be regretted that owing to lack of funds it was not possible even to enumerate the non-European population at the last census. The only reliable figures available for the non-European population are those of the decennial census enumerations, the last of which took place in 1921, when the figures were:—Bantu, 4,697,813; Asiatic, 165,731; mixed and other coloured, 545,548: total, 5,409,092.

### III.—ADMINISTRATIVE MATTERS.

1. *Staff.*—The organisation and functions of the Department and its principal personnel as at 30th June, 1933, are set out in an appendix (see Appendix A.).

As the result of the re-organisation which took place towards the end of last year, one post of Assistant Health Officer was abolished and a post of Under Secretary created with effect from the 1st October, 1932. Mr. A. de V. Brunt was appointed to the latter post; he was succeeded as Chief Clerk by Mr. C. N. Millard.

The reduction in the professional staff unfortunately synchronised with serious illness of two Senior Assistant Health Officers. This caused a serious shortage of Medical Officers and resulted in a considerable lessening of the amount of routine health work that might otherwise have been carried out.

The Housing and Food and Drugs Adulteration Section was amalgamated with the General Section, and Mr. R. S. Gordon, Principal Clerk, placed in charge thereof. This resulted in the abolition of the post of Principal Clerk in charge of the Housing and Food and Drugs Adulteration Section.

The following other changes in staff also took place during the year:—

Dr. F. W. P. Cluver, Assistant Health Officer, Pretoria, was transferred to Durban to take over the duties of Dr. L. Fourie, who in November, 1933, is to succeed Dr. E. H. Cluver, who in turn will be transferred to Head Office, Pretoria.

Dr. F. J. Hauptfleisch, District Surgeon, Parys, was appointed Assistant District Surgeon, Pretoria, in place of Dr. P. C. Eagle, who was promoted to District Surgeon, Pretoria, *vice* Dr. C. W. Caldwell, retired.

Dr. J. W. de Vos, Medical Superintendent, Pretoria Leper Institution, was retired on pension, and was succeeded by Dr. J. J. du Pré le Roux, Medical Officer at the Institution. The post vacated by Dr. le Roux was converted into that of "Medical Officer for Leprosy Research," and Dr. H. v. R. Mostert appointed thereto.



2. *District Surgeons*.—During the year a new District Surgency was established at Sabie, while that at Buchuberg was abolished. The total number of District Surgeons thus remains the same. Their distribution is shown in Table B.

TABLE B.—DISTRICT SURGEONCIES AND ADDITIONAL DISTRICT SURGEONCIES AS AT 30TH JUNE, 1933.

Province.	Whole-time.	Whole-time, but jointly with local authority or public body.	Part-time.			Total.
			On inclusive annual salary.		On annual salary with certain supplementary fees and allowances.	
			District Surgeons.	Additional District Surgeons.		
Cape.....	3	3	—	7	138	151
Natal.....	3	—	—	1	39	43
Transvaal.....	2	—	7	8	54	71
Orange Free State..	—	—	—	11	47	58
UNION.....	8	3	7	27	278	323

The eight whole-time officers are those at Cape Town, Durban (3), East London Port Elizabeth, and Pretoria (2); the three whole-time officers appointed jointly with local authorities or public bodies are those at Grahamstown, Queenstown and Wynberg.

3. *Local Authorities and their Health Staffs*.—The numbers of the various classes of local authorities under the Public Health Act as at 30th June, 1933, are shown in Table C.

TABLE C.—LOCAL AUTHORITIES UNDER THE PUBLIC HEALTH ACT (1919), AS AT 30TH JUNE, 1933.

Province.	Municipalities.	Village Management Boards.	Local Boards.	Village Councils.	Health Committees.	Local Administration & Health Boards.	Magistrates.	Divisional Councils.	Board of Health.	Mining Commissioners.	Total.
Cape.....	130	87	21	—	—	—	29	94	1	1	363
Natal.....	9	—	17	—	17	7	44	—	—	—	94
Transvaal.....	27	—	—	31	35	—	40	—	—	3	136
Orange Free State	61	7	—	—	—	—	35	—	—	1	104
UNION.....	227	94	38	31	52	7	148	94	1	5	697

Whole-time Medical Officers of Health are employed by only nine of these, namely, the Municipalities of Bloemfontein, Capetown, Durban, East London, Johannesburg, Pietermaritzburg, Port Elizabeth, and Pretoria, and the Divisional Council of the Cape. The Kimberley Board of Health, jointly with the Kimberley Municipality, has a medical officer who devotes some of his time to laboratory work at the Kimberley Hospital, but does no private practice. At Grahamstown and Queenstown there are whole-time officers who carry out the combined duties of District Surgeon and Health Officer to the Municipal and Divisional Council.

The smallness of the number of local authorities served by medical men who have specialised in preventive medicine is to be deplored. Our larger towns all need continual expert guidance in public health matters. In the past it may have been impracticable for various reasons to make the necessary professional appointments, but these reasons have now fallen away. In particular both the Medical Schools of our Universities now provide post-graduate courses in public health, and doctors holding the Diploma in Public Health are passing out from these Universities annually. There is, therefore, a satisfactory supply of qualified persons to select from in the Union.

Johannesburg is the only Reef Municipality which has a properly organized public health service with a full-time Medical Officer of Health at its head. Local authorities in whose areas are located the most flourishing industry of the Union can surely offer no excuse for a continuation of such an unsatisfactory state. Vested interests often of quite subsidiary importance should no longer be allowed to stand in the way of an organization for adequately guarding the health of the community entrusted to a local authority.

Negotiations are in progress between this Department and several of the Reef Municipalities. In these cases the Department is offering to assist financially by combining the posts of Medical Officer of Health and District Surgeon for the latter of which



the Government is directly responsible. It is sincerely to be hoped that if these Municipalities do not see their way clear to making full-time appointments of their own, they will at least accept the offer of making a combined full-time appointment of an officer qualified in preventive medicine.

The number of certificated sanitary inspectors employed by local authorities is increasing. On the 30th of June, 1933, those employing such officers devoting the whole of their time to sanitary work were 86 in number, namely, 41 in the Cape, 7 in Natal, 12 in the Orange Free State, and 26 in the Transvaal. The total numbers of such persons are: Sanitary Inspectors, 234; Health Visitors, 16. These officers, too, are very necessary to all organized communities. Numbers of young men are taking the training provided jointly by the Union Government and the Royal Sanitary Institute. A very good type of official is being turned out.

A valuable development in health control is the appointment in the Cape of sanitary inspectors in rural areas. The Divisional Councils of Paarl, Malmesbury, and the Cape, which control a large and important area, employ whole-time sanitary inspectors. While the appointment at Paarl has only recently been made, the Divisional Council of that area is already showing a zealous and keen appreciation of the necessity for public health supervision in the rural area.

#### IV.—WORK OF THE DEPARTMENT.

1. *Inspections, Investigations, and Field Work.*—The necessity for curtailing expenditure on transport of officers resulted in a very considerable reduction in the amount of field work done. Only in connection with malaria prevention can the amount of work done be considered reasonably satisfactory. The very important work of guiding and supervising the activities of the smaller urban local authorities had to be almost entirely discontinued. Of the 439 urban local authorities in the Union, only 22 were visited in this way during the course of the year by the medical officers of the Department. It is considered essential that every local authority which has not a complete and satisfactory health organization of its own should be inspected by a professional officer at least once in every three or four years if grave hygienic faults in the development of the community are to be avoided. It is to be hoped that improved financial conditions will render possible the early active resumption of this very important side of the Department's activities.

##### 2. *Addresses, Published Papers, and Special Investigations by Members of the Staff.*—

SIR E. N. THORNTON, *Chief Health Officer.*

"Position in regard to Plague in the Union of South Africa and the Mandated Territory of South West Africa." Capetown Health Conference held under the auspices of the League of Nations, November, 1932.

"Professional difficulties and Organisation." Introductory Address. Congress of the South African Dental Association held at Pretoria, 4th January, 1933.

DR. G. A. PARK ROSS, *Senior Assistant Health Officer.*

"Malaria." Address, Natal Missionary Conference, 7th July, 1932.

"Malaria Control." Address, Rotary Club, Pietermaritzburg, 13th October, 1932.

In addition, 42 lectures on "Malaria" were given to Farmers' Associations, Women's Institutes and other societies during the year.

DR. W. A. MURRAY, *Senior Assistant Health Officer.*

"Health Factors in the Poor White Problem." Report of the Carnegie Commission. Part IV

DR. E. H. CLUVER, *Assistant Health Officer.*

"The Anti-tuberculosis Campaign in the Union." Broadcast address, Johannesburg, 19th November, 1932.

"South Africa and the Health Organisation of the League of Nations." Address, League of Nations Union, Johannesburg, 12th December, 1932.

DR. A. J. v. D. SPUY, *Assistant Health Officer.*

"The Public Health Aspect of Tuberculosis." Address, Northern Transvaal Branch of Medical Association of South Africa, Pretoria, 12th July, 1932.

"The Problems of Tuberculosis." Address, Trained Nurses' Association, Pretoria, 29th November, 1932.

"The Health of the Pre-school Child." Address, Health Week held by Trained Nurses' Association, Pretoria, 29th May, 1933.

DR. L. FOURIE, *Assistant Health Officer.*

"Some Practical Aspects of Species Sanitation." Address, Annual Congress of the Health Officials' Association, Pietermaritzburg, 5th June, 1933.

A number of public addresses on "Malaria" were given during the year.

DR. F. W. P. CLUVER, *Assistant Health Officer.*

"Enteric Fever Prevention in Rural Areas." *S.A. Medical Journal*, 13th May, 1933.

DR. P. ALLAN, *Tuberculosis Medical Officer.*

"The Effect of the South African Climate on Cases of Tuberculosis and Pre-tuberculosis." *British Journal of Physical Medicine*, December, 1932.

DR. W. F. RHODES, *Government Pathologist.*

"The Medico-Legal Aspect of Abortion."

"The Medico-Legal Aspect of Euthanasia."

"The Bacteriological Diagnosis of Leprosy."

Addresses delivered at meetings of the Capetown Branch of the Medical Association of South Africa during the year.

3. *Health Publicity and Educative Work.*—In Annexure B, pamphlets and leaflets which have been prepared, published and distributed by the Department to date, are furnished.



The following cinema films have been purchased by the Department and are available to local authorities and public bodies for exhibition purposes :—

- “The Rat Menace.”
- “Swat that Fly.”
- “Fly Danger.”
- “Your Mouth.”
- “The Story of John McNeil” (tuberculosis).
- “The War on the Mosquito.”
- “How to Live Long and Well.”
- “One Scar or Many” (vaccination).
- “In His Father’s Footsteps” (insanitary farm-typhoid).
- “The Long *versus* the Short Haul” (dirty milk).
- “Bringing it Home” (child welfare).
- “Bilharziasis.”
- “Malaria” (in Hollands).

A set of small models, specially made for the Department by a health inspector who is also a clever handyman, is stocked by the Department’s health officers at Pretoria, Capetown, and Durban for loan to local authorities and other bodies for demonstrations during “health weeks” and on similar occasions, and for illustrating lectures on hygiene. Each set includes a model for illustrating—

- (1) method of rodent-proofing buildings ;
- (2) an “open-air” room for home segregation of a tubercular patient ;
- (3) Baber’s maggot-traps ;
- (4) Russell’s modified maggot-trap ;
- (5) Russell’s modified box fly-trap ;
- (6) Squatting closet for native use.

The Department has purchased an up-to-date epidiascope with portable electric generator for its propagandist campaign—also lantern slides and three magic-lanterns. It is hoped to increase educative work in connection with campaigns against malaria, plague, bilharzia, and fly-borne disease and general insanitation, so as to ensure the co-operation of an enlightened public.

4. *Laboratories.*—The work done by the Government Laboratories at Capetown and Durban and that carried out on behalf of the Government at the South African Institute for Medical Research, Johannesburg, and at Port Elizabeth is shown in Table D.

TABLE D.—PATHOLOGICAL LABORATORIES : ANALYSES AND EXAMINATIONS,  
YEAR ENDED 30TH JUNE, 1933.

Particulars.	Laboratories.		South African Institute for Medical Research.	
	Capetown.	Durban.	Jo- hannesburg.	Port Elizabeth Branch.
<i>Specimens Examined for—</i>				
Government Departments—				
Agriculture.....	1	33	—	—
Customs and Excise.....	41	—	1	—
Defence.....	538	46	1,065	—
Interior (Mental Hospitals, etc.).....	380	521	671	84
Justice.....	—	155	1,508	—
Justice (Prisons).....	630	175	533	1
Mines and Industries (including Miners’ Phthisis).....	—	—	11,698	—
Posts and Telegraphs.....	13	—	—	—
Public Health (including Leper Insti- tutions).....	8,333	8,925	29,109	5,071
Public Works.....	—	—	—	—
South African Railways and Harbours	75	1,517	—	—
Other Government Work.....	225	74	627	74
General Hospitals (Provincial).....	2,218	9,517	30,827	4,781
Local Authorities.....	22,919	8,912	3,691	5,257
Medical Practitioners.....	8,964	35,217	11,759	1,323
Department of Education (Provincial)..	—	356	—	—
Other Governments or Administrations.	—	—	101	—
Others.....	—	—	302	22
TOTAL.....	44,337	65,448	91,892	16,613
<i>Manufactures and Issues—</i>				
Autogenous Vaccines.....e.c.	275	850	27,625	4,850
Bacterial Vaccines (stock).....e.c.	—	—	249,919	Included in Johannes- burg figures.
Tuberculin Dilutions.....e.c.	—	—	1,367	
Sera (various).....e.c.	—	—	442,768	
Anti-rabic Vaccine.....e.c.	—	—	—	
Bulgarian Milk Cultures.....bottles	—	—	—	—
Insulin.....tubes	—	—	—	—
Chaulmoogra Oil Preparations.....e.e.	137,404	—	—	—
Smallpox Vaccine—Calf Lymph (prepared at Vaccine Institute, Rosebank)..tubes	1,053,244*	—	—	—
Attendances at Courts of Justice by Members of Staff.....	20	20	6	—
Total Days’ Absence entailed by such attendances.....	20	20	10	—

\* 779,000 tubes manufactured during year.



5. *Port Health Administration*.—In Annexure C is a summary of the health work at the ports of the Union during the year.

Throughout the year measures were taken to minimise the danger of introduction at our ports of rodent plague. All ships coming either from plague-infected ports or ports serving plague-infected countries are inspected, and particulars regarding their previous deratisation or exemption from deratisation specially recorded. All deepwater vessels examined were found singularly free from rodent infestation, excepting for a small number of vessels from some of the minor ports of Great Britain where for deratisation dependence is still placed on sulphur pans and trapping. Regular inspection of coasting craft is carried out; all necessary measures were taken to keep them in a rodent-free condition.

No cases of formidable epidemic diseases (plague, small-pox, cholera or yellow fever) occurred on vessels arriving at Union Ports during the year.

With regard to the risk of introduction of small-pox infection representations were made by the Government of India that the precautionary measures adopted in the Union were unnecessarily stringent. The matter was discussed at the Capetown Health Conference and a provisional agreement was reached that if the Government of India on the one hand would take measures to prevent as far as possible the issue of fraudulent medical certificates the Government of the Union would on the other hand be prepared to modify its regulations on the lines suggested by the Permanent Committee of the Office International d'Hygiene Publique. The proposed amended regulations will prohibit the disembarkation of any person who immediately prior to embarkation had been in any part of India unless he produces acceptable evidence of having been successfully vaccinated not less than twelve days, and not more than 3 years prior to the date of embarkation from India, or bears marks of having previously suffered from smallpox, or is insusceptible to vaccination.

Outbreaks of measles have been of frequent occurrence on Japanese emigrant ships on their way to South America. These vessels each carrying about 1,000 emigrants pass through Union Ports fortnightly. Among the numerous children closely confined such diseases as measles, chickenpox and scarlet fever spread rapidly. To such infected vessels a restricted pratique has been granted; children were prohibited from landing and only essential labour and official visitors allowed to go on board.

6. *Health Supervision of Air-craft*.—As pointed out in previous reports, the Department has been concerned about the possibility of the introduction into the Union of formidable epidemic diseases, more particularly yellow fever, by air-craft. Steps were taken to amend the proposed International Convention for the Sanitary Control of Air-craft in such a way as should enable States in Southern Africa to sign it. As amended, it allowed for a period of quarantine or detention of passengers if considered necessary in the country of arrival. Many matters requiring adjustment between African States still, however, remained. Early in 1932, therefore, the Department communicated with the Director of the Health Section of the Secretariat of the League of Nations, drawing attention to various questions relating to public health administration and protection against epidemic diseases on which it was considered important to hold a conference with other Administrations. As a result of this communication, the Secretariat decided to hold a Conference in Capetown, to which the Governments of a large number of African countries, the Government of British India, and the Rockefeller Foundation were invited to send representatives. The following countries, in addition to the Rockefeller Foundation, were actually represented at the Conference. Angola, Basutoland, Bechuanaland Protectorate and Swaziland, British India, Kenya, Gold Coast, Mozambique, Nigeria, Northern Rhodesia, Southern Rhodesia, South West Africa, Tanganyika, Uganda, Union of South Africa, Zanzibar.

The Conference was in session at the House of Assembly from 15th to 25th November, 1932, under the chairmanship of Sir George Buchanan, Senior Medical Officer of the British Ministry of Health, who, along with Dr. C. L. Park, represented Health Committee of the League of Nations; Sir Edward Thornton was appointed Vice-Chairman. The following matters were dealt with :—

Yellow Fever,  
Plague,  
Smallpox,  
Leprosy,  
Transmission by air-craft of diseases other than Yellow Fever.

The great advantages of personal discussion between responsible officials of neighbouring territories on all these subjects were so evident that the delegates considered it desirable that a similar conference should be convened by the League of Nations not later than 1935.

*Yellow Fever*.—The possibilities of the extension of yellow fever to regions of Africa as yet unaffected demanded special attention in consequence of the opening-up of roads, railways, and new lines of traffic traversing territories of different Governments, and notably of the rapid extension of air traffic and air trunk lines. It was considered that the best safeguard against infection being introduced by air-craft would be for the International Sanitary Convention for Aerial Navigation, 1932, to be adopted by each country in Africa. A recommendation to this effect was unanimously approved by the Conference; this has since been endorsed by the Council of Public Health as far as the Union is concerned.



The existing area of endemicity is not known with any degree of certainty. New laboratory tests have recently been devised for ascertaining the extent of areas infected with yellow fever. These have already revealed that infection has spread far inland. Representatives of each country undertook to furnish the Rockefeller Foundation with samples of sera of the blood of its inhabitants, taken at selected places, with a view to their being tested for immunity to yellow fever. This data should, within about a year, reveal how far north, east and south the infection has spread from the West Coast. On the conclusion of these tests, the Rockefeller Foundation will probably wish to withdraw from the investigation, having completed the research it set out to do. Thereafter the various African Governments will be requested to carry out an annual survey in the neighbourhood of proved infected territories in order that active measures may be instituted over a wide area adjoining to prevent further spread.

Meanwhile, Governments at present remote from the scene of infection have been requested to make an *Aedes* survey, so that the amount of risk may be assessed. Such a survey will certainly be necessary at Walvis Bay and Windhoek in South West Africa, and at most of the towns and hamlets in South Africa on the East Coast—including Durban.

*Plague.*—Infection which is widespread in the Union has been demonstrated also on its borders, particularly in the southern portions of the Bechuanaland Protectorate. West Africa and Angola have become infected, and it is probably only a question of time before other countries become similarly infected. There did not appear to be any demonstrable factor which could be expected to prevent the slow spread of plague north and east, since the climatic and other conditions which prevail in neighbouring countries resemble those of the Union.

*Smallpox.*—The adoption of uniform regulations for the prevention of the introduction into Southern and Eastern Africa of smallpox from India was considered. The question had arisen owing to the different requirements of African Governments in respect of vaccination of immigrants; such immigrants had in the past been responsible for outbreaks of smallpox in their country of destination. The East and South African Governments wished to prevent the immigration of persons not protected against smallpox either by vaccination or a previous attack of the disease. It was agreed that the final decision as to the protection enjoyed by an individual rests with the Port Health Officer at the port of debarkation, but reliable certificates might assist him to decide in individual cases; the validity of certificates not issued by the health authority at the port of embarkation should be officially attested by that authority, if they are to be of value to the health authority at the port of debarkation.

*Leprosy.*—A useful discussion took place on this disease. It was generally agreed that certain cases of leprosy which, while showing clinical evidence of activity, nevertheless do not secrete bacilli, should not be compulsory detained in leper institutions. This view was subsequently endorsed at a meeting of the Union Leprosy Advisory Committee.

*Transmission by Air-craft of Diseases other than Yellow Fever.*—The Conference reviewed the provisions of the International Sanitary Convention for Aerial Navigation regarding not only yellow fever, but also other diseases. These provisions would not entail on Administrations responsibilities or obligations which would be difficult to fulfil in practice; they represent an obvious convenience and an important safeguard for public health.

Dr. du Toit, Director of Veterinary Services of the Union of South Africa, made a valuable contribution to the Conference on the subject of transmission of animal diseases by air-craft. The Conference recommended that this communication should receive early attention from the appropriate international authorities.

7. *Adulteration or False Description of Food, Drugs and other Articles.*—The Food, Drugs and Disinfectants Act, No. 13 of 1929, and the Regulations thereunder, came into force on the 1st April, 1930. Administrative measures taken under this Act are indicated in Table E.

TABLE E.—SAMPLES TAKEN FOR EXAMINATION OR ANALYSIS UNDER ACT NO. 13 OF 1929, DURING YEAR ENDED 30TH JUNE, 1933, AND THE RESULTS.

Place.	Total Taken.	No. Analysed or Examined.	No. found Adulterated or Incorrectly or Falsely Described.	Prosecutions.	Convictions.	Remarks.
Ports of Union.....	196	173	11	—	—	43 consignments detained pending relabelling. 1 consignment reshipped. 1 consignment destroyed.
Cape Province.....	1,576	1,552	296	69	54	
Natal Province.....	389	387	39	15	9	
Transvaal Province..	1,148	1,147	96	57	45	
Orange Free State Province.....	133	131	14	12	11	
TOTALS.....	3,442	3,390	456	153	119	



*Imported Articles Dealt with at Ports of the Union (including Inland Customs' Ports of Entry).*—The Department carries out this work in collaboration with the Department of Customs and Excise. Considerable fewer samples than last year were analysed as most of the more common articles of food have been examined in previous years, and those found to comply with the provisions of the Act and Regulations are only occasionally re-examined. In the case of articles of food found not to comply with the Act, the manufacturers have either altered their standards so as to comply, or the Department has prohibited the entry of further consignments.

*Sampling by Local Authorities.*—Local authorities may be empowered to carry out and enforce the provisions of the Act and Regulations in respect of perishable articles and also flour, meal, bread and other articles not packed or sold in sealed packages. The municipalities so empowered, to which Capetown and Potchefstroom were added during the year, number twenty-six and include all the largest centres in the Union. A total of 1,348 samples was analysed on behalf of these local authorities; 147 samples were found to be adulterated, in respect of which 63 prosecutions were instituted, resulting in 49 convictions. The more important articles analysed included 1,130 milks (100 adulterated); 30 ice-creams (9 adulterated); 34 meats (9 adulterated); 31 bread (none adulterated); 18 butter (2 adulterated); and 59 coffees and mixtures thereof (18 adulterated).

*Sampling by the Department.*—The Department, with the co-operation of the Police in the smaller urban areas and in the Johannesburg Municipal Area with the assistance of the Council's inspectors in sampling milks on Railway premises and dealing with other articles not falling to be dealt with by the Council itself under the delegated powers referred to in the preceding paragraph, caused 1,898 samples to be submitted for analysis. Adulterations or samples below standard numbered 298, prosecutions 90 and convictions 70. Where samples were found to be only slightly below standard, or the infringements consisted virtually of incorrect labelling, warnings were issued to the responsible delinquents. The more important articles analysed included :—

*Food Articles.*—Milks, 1,381 (160 adulterated); ice-creams, 34 (28 adulterated); meat and fish, 41 (20 adulterated); bread, 28 (none adulterated); coffees and mixtures thereof, 56 (11 adulterated); honey, 14 (4 adulterated); fruit juices and aerated waters, 58 (32 adulterated); chocolate covertures, 12 (5 adulterated).

*Soaps.*—25 (none adulterated). In view of complaints regarding evasions of the labelling provisions of the regulations in respect of soaps, it was decided by the Department to accept one of the following ways of labelling :—

- (a) stamping or embossing the prescribed information on the soap; or
- (b) printing it on the wrapper, if wrappers are used, or on a carton; or
- (c) printing or stencilling it on the box containing the bulk stock.

*Drugs.*—Of 33 samples submitted for analysis, 12 were found not to be up to standard or incorrectly labelled; but in only 1 case was the contravention serious enough to warrant a prosecution, which, however, resulted in acquittal. Warnings were issued in the other instances.

*Disinfectants.*—17 samples of imported disinfectants were examined and all were found to comply with the standards. In 16 cases, however, warnings were issued in respect of incorrect labelling, 12 of which were detained by the Customs authorities and released after the infringements were rectified. Sixteen samples were taken in the country, 2 being found not up to standard out of 10 analysed, and 15 warnings were necessary in regard to labelling.

It is worthy of note that of a total of 3,390 samples analysed only 456, or approximately 13 per cent., were found to be adulterated or not up to standard, as compared with 22 per cent. for the previous year. This general improvement is gratifying. It must be borne in mind too that (except for the periodical sampling of milk) samples are not purchased at random, but only when there are grounds for suspecting adulteration, or when complaints are received from competing firms or other sources. The total number examined includes over 50 different classes of foods.

In regard to milk prosecutions, heavier fines than in past years were imposed by magistrates. This is probably the result of the frequent amplification of analysts' certificates by an expression of opinion to the effect that deficiencies in the prescribed standards for milk-fat or milk-solids-not-fat were due to the addition of water or the abstraction of fat, which the more scientific methods of analysis employed reveal.

Three prosecutions in respect of adulterated honey resulted in convictions and the imposition of fines totalling £14.

The degree of publicity given by the press to prosecutions under the Act cannot but have a salutary effect in impressing on manufacturers and dealers the seriousness of adulteration of foodstuffs.

Considerable progress has been made by the commercial community to ensure full compliance with the labelling requirements of the Act, as a result largely of regular visits of inspection and instruction to firms by departmental inspectors. That manufacturers and retailers realise the importance of labelling is becoming increasingly evident from the number of letters addressed to the Department seeking information, the submission of proofs of labels before printing, and personal interviews granted to business representatives.



*Amendments to Regulations.*—The 1932 edition of the British Pharmacopoeia was substituted, under Regulation No. 31, for that of 1914, in order to ensure compliance with a standard for drugs in conformity with the latest advances and discoveries in therapeutics and the ancillary sciences. In regard to drugs not mentioned in the 1932 British Pharmacopoeia, the standards of those mentioned in the British Pharmaceutical Codex published in 1923 apply as before, with the exception of certain drugs or articles which it was decided to exempt from such standards—as toilet vinegar, hair lotion, eau-de-Cologne, camphor ice, etc.

As no percentage of pepper was laid down under the original Regulation 23 (4) in respect of "Compound Pepper" and complaints were received of unfair competition through the marketing of a very inferior commodity, an amendment was made prescribing a minimum pepper content of 50 per cent. for this article.

An alteration was made to the existing regulation whereby sulphur dioxide used in foods was exempted to a specified extent from being declared on labels, particularly in view of representations made in respect of the manufacture of grape juice.

A slight amendment affecting the labelling requirements was made in respect of bread made from rye meal or a mixture of cereals.

A minor alteration was made defining the size in which the required information shall be printed on labels in respect of any package, container, etc. from which food is taken for retail sale direct to the purchaser.

*General Warranties.*—Twenty-three registered general warranties were in force at the beginning of the year and were all renewed, with the exception of one in respect of Coffee and Chicory Essence, which was cancelled by the owner. Samples of 13 different articles so registered were analysed and found to comply with the approved specifications, with one exception necessitating the issue of a warning. Samples are to be taken of the remaining 9 articles.

*General.*—Periodical tours of inspection were undertaken during the course of the year by the Department's inspectors, who are stationed at Pretoria, Capetown and Durban. A wide field has been covered embracing all the fairly populous districts of the Union, including such remote parts as Kuruman, Gordonia, Kenhardt, Griqualand East, the Transkei, Zoutpansberg, Waterberg, and all parts of the Free State and Natal. The commodities of manufacturers, wholesalers and retailers are inspected on the premises, and opportunity is taken to explain the provisions and requirements of the Act to all concerned. Verbal warnings are given in cases of contraventions; followed up where necessary by written warnings issued from the head office or the Capetown office, upon receipt of the inspectors' reports. On subsequent visits these matters are enquired into in order to take further action if necessary.

There was a tightening-up and stricter control during the year in the administration of the Act in Johannesburg and other Reef towns which are the main manufacturing and distributing centres for the Transvaal and Orange Free State Provinces. The significance of such policy is manifest in Natal, where contraventions of the Act in the sale of articles in the country districts have been reduced to a minimum, through a concentration of activities in Durban.

*Assay of Therapeutic Substances.*—The assay of a number of substances used therapeutically against international standards is carried out in leading European countries. The necessity for similar examinations of such substances in the Union has become increasingly evident. Steps are being taken by the Department to devise machinery for undertaking this work locally. The substances which it is considered should be carefully supervised in the interests of the general public fall under four groups:—Certain drugs such as digitalis, strophanthus, ergot, arsphenamine, neoarsphenamine, sulpharsphenamine; glandular extracts such as insulin, pituitrin, thyrosin, adrenalin; the various concentrated vitamin preparations; and lastly the very important group of sera and vaccines which are now so extensively used in medical practice.

8. *Unsound Foodstuffs.*—The regulation framed under Section 115 of the Public Health Act dealing with the preparation and sale of unsound foodstuffs packed in airtight receptacles, and restricted to fish or meat products, was recently amended under Government Notice No. 734 of the 16th May, 1933, to embrace all articles of food, as this was considered essential in the public interest in view of the possibility of food poisoning.

During the year 45 tins of fish and one tin of minced meat found to be badly blown were seized at a country store by an Inspector of this Department and were destroyed with the consent of the owner. Considerable quantities of similar articles were seized and condemned by the health staffs of Local Authorities during the year.

Large quantities of imported articles of food, including consignments of wheat, rice, potatoes, dates, fish, peas, tomatoes, berries, biscuits, etc. found by Port Health Officers to be unfit for human consumption, were seized and destroyed under the Port Health Regulations at the four chief ports of the Union during the year.

*Bacterial Food-Poisoning.*—An outbreak of food-poisoning occurred amongst passengers and staff of the train leaving Durban for Johannesburg on the 8th February, 1933. A careful enquiry into the circumstances was made by a Board consisting of representatives from the Railway Administration and the Public Health Department. Of the 24 passengers who partook of the dinner provided in the dining saloon, 9 subsequently took ill, and 1 died. The 15 members of the train staff who were supplied with



food from the saloon all became ill. In all cases the symptoms were those of acute gastro-intestinal irritation—vomiting, diarrhoea, collapse, sweating, fever, weak and rapid pulse, pallor. Very efficient measures were adopted by the railway authorities for treatment of the patients at Greylingstad, Heidelberg and Nigel, and for hospitalisation in Germiston and Johannesburg. Passengers and staff proceeded to Capetown were further supervised at Bloemfontein and Kimberley by railway medical staff.

The clinical symptoms described by the doctors attending the cases left little doubt that the outbreak was due to bacterial food-poisoning by members of the salmonella group of organisms. This was subsequently confirmed by examination of stools of the patients by the South African Institute for Medical Research. Specimens were submitted from 9 patients, and from 8 of them the *Bacillus aertrycke* was isolated; in the ninth specimen, though this organism could not be recovered from the faeces, the blood gave a positive reaction, agglutinating the strain of *B. aertrycke* contained in stool and isolated from the stool of one of the patients.

Samples of all the available foodstuffs eaten by patients in the dining saloon were also bacteriologically examined. *B. aertrycke* was recovered from the roast veal, green beans, and the ice. Samples of the water on the train—comprising filter-water, lavatory water, cold and hot water—were examined, but from none of them were organisms of the food-poisoning group recovered. Numerous other specimens were examined, such as swabs from the ice-boxes, mice caught in the Johannesburg railway perishable store, and any other material that it was thought might possibly have been contaminated, but from none of these was the *B. aertrycke* recovered.

The evidence available pointed clearly to the original infection having been derived from the block of ice in the ice-box. The organisms were recovered from this block of ice after its surface had been suitably treated by scalding. It was therefore evident that the ice could not have become casually infected through being handled by a human carrier on the train, or by contact with infected food substances placed in the ice-box. The articles of food from which the infective organism were recovered may, on the contrary, be assumed to have become infected by contact with the melting block of ice. The ice was taken on at Durban, and the probabilities are that the water from which the ice was prepared, or the receptacle into which this water flowed, had been contaminated by a patient or a carrier of the disease.

9. *Health of Natives on the Witwatersrand Gold Mines.*—Supervision of health conditions on the mines was continued. Enquiries into mining hygiene problems had again to be considerably curtailed owing to shortage of staff; Dr. E. H. Cluver had to be seconded for lengthy periods for other duties.

The office in Johannesburg works in close association with that of the Director of Native Labour regarding matters of native housing, feeding and hospital accommodation. Recommendations made by the Assistant Health Officer are followed up by inspecting officers of the Native Affairs Department. Mine Managements continue to co-operate readily with the result that such improvements as are from time to time found necessary are effected without friction.

An important duty of the Johannesburg officer is the examination of all plans in connection with native housing and hospitalisation on the mines. This work has been much simplified owing to the alteration in the regulations published last year. The older regulations did not make sufficient provision for hygienic housing; to effect this, much discussion and correspondence was often necessary. The new regulations set out accurately the hygienic requirements considered necessary by the Department, and all plans for new compounds and extensions to existing compounds are now submitted in compliance with these. In particular they limit the number of bunks in the boys' rooms to 20 and partitions between the sleeping boys are required. With these improvements the risk of spread of respiratory disease among the native labourers on the mines has been very greatly lessened. Building supervision has become of considerable importance in view of the active mining development at present in progress.

*Heat Stroke.*—During the year 20 fatal cases of heat stroke were reported from deep mines in the central and eastern Witwatersrand areas. Nine mines were involved in these deaths. This makes a total of 130 deaths from this cause on the mines since 1924, in which year a single death was reported from a deep level mine.

A review of these cases showed that the view previously expressed regarding tribal acclimatisation is confirmed. In Table F the cases are shown according to the region from which the boys were recruited. The first column of figures shows the actual number of deaths. In the second column the deaths are expressed in proportion to the numbers of boys from each region working in the deep levels where the wet bulb thermometer records a temperature of 86° F. or over; it is in these levels that the great bulk of the cases occur. It will be seen that the natives recruited from the cold heights of Basutoland are nearly twice as susceptible as the tropical natives recruited from Portuguese territory. The Eastern Cape Province natives take an intermediate place. It would appear, therefore, that natives recruited from latitudes nearer the equator have a decided advantage in deep level mining over those from further south. Their rare deaths are an extreme expression of this advantage. This advantage must also obtain in less easily assessed ways such as greater working efficiency and lessened susceptibility to disease.



TABLE F.—FATAL HEAT STROKE CASES ON THE WITWATERSRAND MINES,  
1924 TO JUNE, 1933.

Area of Recruitment.	Number of Deaths.	Rate per 10,000 of the average number from each region working in hot zone.
Basutoland.....	35	121
Eastern Cape.....	52	198
Mozambique.....	33	65
Other Areas.....	10	—
TOTAL.....	130	

The importance of local acclimatisation and individual susceptibility is clearly brought out by the figures. Of the 130 cases, 87 collapsed during the first or second shift worked in the hot place. All the deep level mines have now adopted a system of acclimatisation of new boys before putting them on the hard work in hot zones. Various methods have been adopted. The most satisfactory is that of putting the boys on to light work in a moderately warm place, followed by hard work in that place, then light work in the hot place. Light work is best arrived at by issuing only one shovel to every two boys and instructing them to hand over the shovel to another boy on the slightest fatigue. This acclimatisation is usually spread over a period of a fortnight. Heat collapse only exceptionally occurs in boys who have served in an acclimatisation gang ; in such cases evasion of proper acclimatisation is generally elicited on investigation.

In addition to acclimatisation elimination of boys specially susceptible to heat is now carried out on two mines of the Central Mining—Rand Mines Group. The method adopted for elimination of such susceptibles consists of setting all recruits to do muscular work in a specially constructed chamber the atmosphere of which is kept saturated with moisture at a temperature of about 94° F. The rise of body temperature under these conditions makes it possible to assess the efficiency of the physiological cooling mechanism. The recruits are divided into three groups according to their reaction in the chamber. Those who show no susceptibility to heat in the chamber served an acclimatisation period of only 5 days, those slightly susceptible 7 days, those markedly susceptible 14 days. This chamber test has already fully justified itself. At the City Deep Mine where it is in full working there has not only been a reduction in the number of heat stroke cases, but also a great saving in working shifts on the mine.

*Scurvy.*—This disease continues to cause trouble in spite of the provision throughout the mines of anti-scorbutic substances to supplement the mealie-meal on which the natives largely subsist. During the year 273 cases were admitted to mine hospitals for this condition. The number is large when it is borne in mind that only severe cases are treated primarily for this condition. Many accident cases for instance develop scurvy but are not recorded as such for statistical purposes.

Florid scurvy frequently develops in recent recruits who are put on to hard work underground. The reason for this is that they arrive on the mines in a sub-scorbutic state due to their subsistence in the territories almost exclusively on mealie-meal which is devoid of vitamin C. Owing to the easy life at home scurvy may not become manifest there, but it quickly shows itself on the mines if the boy is immediately put on to hard work without a preliminary feeding up on the good mine diet. Even in older boys the condition will develop if they deliberately discard the anti-scorbutic substances provided. This is now obviated on many of the mines by grinding up the raw vegetables to a pulp which is stirred into the stew at the end of the cooking process.

#### V.—INFECTIOUS AND PREVENTABLE DISEASES.

1. *Notifications.*—The following table shows the notifications of infectious diseases by medical practitioners during the year, the totals for the previous year being inserted for comparison. It must be borne in mind that many cases of such diseases, particularly in natives, are never seen by a medical man, and consequently are not notified :—

TABLE G.—NOTIFICATIONS OF DISEASES BY MEDICAL PRACTITIONERS DURING THE YEARS ENDED 30TH JUNE, 1932 AND 30TH JUNE, 1933.

Disease.	Year Ended 30th June, 1932.		Year Ended 30th June, 1933.									
	Union.		Cape Province, excluding Transkei.		Transkei.		Natal.		Orange Free State.		Transvaal.	
	Union.	Total.	European.	Non-European.	European.	Non-European.	European.	Non-European.	European.	Non-European.	European.	Non-European.
Anthrax.....	31		7	12	—	3	—	5	6	14	—	14
Diphtheria.....	1,361		392	231	7	8	146	44	45	19	282	31
Encephalitis, Infective.....	31		6	8	—	—	3	—	—	4	4	1
Enteric or Typhoid Fever.....	4,505		568	716	24	111	106	280	172	459	685	1,268
Erysipelas.....	330		75	54	—	1	20	6	8	5	111	92
Glanders.....	—		—	—	—	—	—	—	—	—	—	—
Leprosy.....	112		—	24	—	18	—	12	—	7	3	53
Malta Fever.....	5		2	2	—	—	—	—	—	—	2	—
Meningitis, Epidemic Cerebro-spinal.....	370		54	117	1	8	1	3	4	11	33	76
Ophthalmia, Gonorrhoeal.....	69		25	27	—	2	—	3	2	4	4	1
Ophthalmia Noenatorum.....	358		45	263	—	1	1	4	5	25	20	17
Plague (for complete list of cases and deaths, see Table L).....	1		—	—	—	—	—	—	2	6	—	—
Polioomyelitis, Acute.....	22		11	12	—	—	1	2	4	2	13	1
Puerperal Fever, including Puerperal Sepsis..	303		48	134	1	4	7	7	12	16	70	74
Rabies.....	—		—	—	—	—	—	—	—	—	1	—
Scarlatina or Scarlet Fever.....	911		256	17	4	—	84	2	99	3	592	7
Smallpox (for complete list of cases and deaths, see Table M).....	9		—	7	—	2	—	—	1	5	—	—
Trachoma.....	31		9	13	—	—	—	1	—	—	—	13
Tuberculosis.....	6,449		481	3,244	—	810	102	674	29	179	98	1,294
Typhus Fever (for complete list of cases and deaths, see Table O).....	933		34	234	4	771	10	70	1	94	1	12
Lead Poisoning.....	—		3	2	—	—	—	—	—	—	1	—
TOTALS.....	15,831		2,016	5,117	41	1,739	481	1,113	390	853	1,920	2,954



2. *Cerebro-spinal Meningitis*.—This distressing disease continues to be fairly prevalent in certain parts of the Union. The notifications during the past three years were 404, 370 and 308. The disease is probably more prevalent than these figures indicate because of faulty diagnosis. Cases subsequently shown to be due to cerebro-spinal meningitis have been variously attributed to plague, typhus or poisoning. The last named diagnosis has on occasion been responsible for expensive chemical analyses being carried out because of possible medico-legal implications.

It is, therefore, desirable that medical practitioners should be aware of the alarming rapidity with which fatal symptoms may set in on some occasions. Such cases occur during the winter months, and also sometimes at the commencement of a focal outbreak; they may occur singly or there may be several cases in one household. Many of such cases have only shown the following signs and symptoms, viz. :—

Temperature—Raised or sub-normal.  
Pulse—Rapid and feeble; lips blue and face dusky.  
Vomiting and headache are constant signs.  
Drowsiness, coma and death occur within a few hours of onset.

Purpuric rashes and other indications of meningitis have generally, though not always, been absent. The causal agent in all the investigated cases has been the meningococcus, death having occurred during the early septicaemic stage before meningeal signs became evident. *Post mortem* findings are indefinite apart from general congestion of the organs and a purulent discharge at the base of the brain and in the spinal canal.

Diagnosis of these cases is of great importance, because if not recognised contacts are so likely to become infected and contract the disease.

3. *Enteric or Typhoid Fever*.—This disease continues to be unduly prevalent as indicated by the annual notifications. The notifications during recent years were as follows :

1926-27.....	4,018 cases.
1927-28.....	5,787 „
1928-29.....	4,963 „
1929-30.....	3,775 „
1930-31.....	4,793 „
1931-32.....	4,505 „
1932-33.....	4,389 „

The actual incidence of the disease is certainly much higher than these figures indicate, because of imperfect notification, particularly among natives, and the fact that the causative bacillus not infrequently produces a condition which is not recognisable, apart from special laboratory tests, as the disease typhoid. It is also probable that in many Bantus the classical clinical picture is, more often than not, absent. Many cases of typhoid are, therefore, likely to be missed in areas where modern laboratory facilities are not available or utilized.

Typhoid is a disease the prevalence of which fairly accurately reflects the degree of insanitation of a community. Cleanliness in the widest sense of the term is the essential weapon against infection. Proper measures for the disposal of night soil and other refuse are of prime importance. To combat this disease communities and industries are urged to adopt water-borne sewerage systems. The very best of conservancy or bucket systems can never be entirely satisfactory.

It is the presence of numerous apparently healthy carriers of typhoid infection that make absolute cleanliness so important. As the bulk of the carriers, particularly among the native population, move about unrecognised in our midst, all human excrement must be looked upon as suspect. Measures aimed directly at lessening the risk from carriers are almost impossible to carry out effectively. Where they are recognised supervision is carried out as far as practicable. Native carriers can seldom, however, be kept under supervision after they leave a municipal area and return to the territories. The only really effective method of treatment of a carrier is by operative removal of the organ in which the bacilli are multiplying—the gall bladder or the kidney. This is of course a serious operation and it is hardly to be expected that affected persons will agree to such a procedure.

Owing to the fact that typhoid prevalence must be looked upon as a criticism of the sanitation measures of a community the Department publishes annually a table showing the incidence of the disease, in the hope that the local authorities that show up badly will concentrate to a greater extent on sanitation. This table (Table H) shows all the Local Authority areas in which prevalence was unduly high.

TABLE H.—ENTERIC OR TYPHOID FEVER—NOTIFICATIONS AND INCIDENCE IN CERTAIN LOCAL AUTHORITY AREAS DURING THE YEAR ENDED 30TH JUNE, 1933 (ARRANGED IN ORDER OF INCIDENCE RATE)—EXCLUDING CASES RETURNED AS “IMPORTED.”

Place.	Notifications.			Incidence per 1,000 of Population.		
	European.	Non-European.	Total.	European.	Non-European.	All Races.
Van Stadensrust....V.M.B.	3	8	11	14.78	40.00	27.30
Koffiefontein.....M.	4	39	43	2.89	44.42	19.01
Uniondale.....M.	15	9	24	23.18	12.41	17.49
Nigel.....M.	—	56	56	—	25.34	15.55
Empangeni.....L.B.	8	5	13	11.87	27.17	15.15
Petrusville.....M.	12	—	12	21.43	—	12.85
Ladybrand.....M.	9	32	41	3.76	19.83	10.22
Cala.....M.	7	7	14	9.51	10.45	9.96
Sterkstroom.....M.	13	7	20	12.06	6.71	9.43
Wepener.....M.	7	10	17	5.61	11.64	8.07
Alice.....M.	—	18	18	—	10.73	7.56
Clocolan.....M.	4	8	12	3.36	9.62	5.93
Aliwal North.....M.	3	35	38	1.12	9.08	5.82
Molteno.....M.	4	10	14	3.13	8.27	5.63
Greytown.....M.	6	14	20	4.29	6.40	5.57
Senekal.....M.	7	8	15	4.12	6.44	5.10
Springs.....M.	10	104	114	1.30	6.97	5.05
Somerset East.....M.	4	22	26	1.72	7.58	4.98
Brakpan.....M.	11	128	139	0.98	7.29	4.83
Adelaide.....M.	2	11	13	1.42	7.95	4.66
Hercules.....M.	18	10	28	4.02	6.19	4.59
Boksburg.....M.	28	137	165	2.00	5.36	4.17
Krugersdorp.....M.	31	47	78	2.26	4.32	3.17
Standerton.....M.	1	12	13	0.44	6.32	3.10
Kroonstad.....M.	7	35	42	1.35	3.89	2.96
Burghersdorp.....M.	3	8	11	1.50	4.62	2.95
Uitenhage.....M.	30	16	46	3.21	2.50	2.92
Benoni.....M.	16	132	148	0.91	3.86	2.86
Queenstown.....M.	5	28	33	0.76	3.67	2.32
Graaff-Reinet.....M.	6	15	21	1.35	3.15	2.24
Middelburg (Cape).....M.	2	8	10	0.92	3.51	2.24
Bloemfontein.....M.	23	72	95	0.98	3.11	2.04
Pretoria.....M.	102	61	163	1.82	2.29	1.97
Bethlehem.....M.	3	12	15	0.62	4.02	1.91
Germiston.....M.	28	40	68	1.43	2.40	1.88
Klerksdorp.....M.	5	6	11	1.39	2.34	1.78
Cradock.....M.	6	6	12	1.66	1.70	1.68
Paarl.....M.	14	7	21	1.79	1.05	1.45
Roodepoot.....M.	9	27	36	1.11	1.59	1.44
Johannesburg.....M.	101	247	348	0.51	1.70	1.01
Randfontein.....M.	—	21	21	—	1.17	0.99
Grahamstown.....M.	6	7	13	0.79	0.91	0.85
Pietermaritzburg.....M.	5	25	30	0.24	1.41	0.78
Port Elizabeth.....M.	25	28	53	0.61	0.98	0.76
East London.....M.	20	8	28	0.98	0.45	0.73
Durban.....M.	24	52	76	0.39	1.08	0.69
Capetown.....M.	69	58	127	0.50	0.51	0.51
Kimberley.....B. of H.	1	12	13	0.06	0.56	0.33

M. = Municipality.      B. of H. = Board of Health.      L.B. = Local Board.

All European rates calculated on population as at Census 1931.  
Non-European rates calculated on population as at Census 1921, except Capetown, Port Elizabeth, East London, and Bloemfontein, which are calculated on population as at Census 1926.

4. *Exzematoid Ringworm (Athlete’s Foot)*.—In the past half-dozen years there has been a very definite increase in the number of cases of this condition, both in Capetown and Durban. It is probable that this increase has occurred throughout the Union, but detailed information is not available. In Capetown, three skin specialists had under treatment during the past year over 100 cases of the disease. Further, a considerable number of cases have been reported up-country as having been infected at the coast.

Exzematoid Ringworm is an infectious skin eruption starting usually between the toes, where it may remain localised or spread to the upper or under surfaces of the foot. Not infrequently it spreads to the palms of the hands and between the fingers. This is sometimes the first site observed by the patient, who may not have noticed the initial lesions on the foot. The lesion commences with the formation of vesicles which contain a clear sticky fluid; these visicles tend to coalesce, and desquamation follows. The vesicle may contain pus, due to secondary infection. In some cases the initial lesion between the toes remains as a small fissure, with thickening of the surrounding epithelium.

The causative organism is a fungus, *Epidermophyton*, which is similar to that causing “Dhobie Itch”—*Tinea cruris*. The fungus can be seen under the microscope in preparations made from the vesicles. It can be grown on suitable laboratory media such as Saboraud’s Maltose Agar.



The fairly rapid increase of this condition makes it necessary to pay attention to its infectivity and the preventive measures that should be adopted. A number of patients were able definitely to trace their infection to common dressing-rooms, such as those at golf club-houses. It is probable that coir mats and ropes in bathing-pools harbour and spread the infection; their use has therefore been prohibited in the United States of America. Infection also appears to be more likely to occur when the skin is wet and sodden, such as after bathing. A prophylactic measure which can with advantage be used in golf-houses, bathing-pools, etc., consists of the provision of solutions of sodium hyposulphite or one of the chloramine preparations, in which the feet may be dipped.

A satisfactory preparation for treatment of the condition is a saturated solution of salicylic acid in equal parts of alcohol and ether; this is painted on to the affected skin surface on three successive nights. Such treatment is generally effective, although the condition is apt to recur. In obstinate cases X-ray treatment may be necessary.

A Joint Committee of the American Public Health Association and States Sanitary Engineers, reporting on swimming-baths, calls attention to the increase, and the need for special precautions to prevent the spread, of infectious skin diseases of the feet at swimming-pools and other public bathing-places. They state that most, if not all, of these foot diseases are caused by a fungus which is spread by infection of the floors of dressing-rooms at bathing-places, gymnasiums, and other places where persons go bare-foot. The preventive measures they recommend are as follows:—

Regular inspection of feet, especially the toes, of all bathers; persons showing infection should be excluded from the pool and dressing-rooms, and advised to consult a skin specialist.

Daily washing, with a strong solution of chlorinated lime, of all floors, benches, stools in dressing-rooms, diving-boards, out-of-water portions of ladders or steps, rubber mats, etc.; it is known that the fungus will grow readily on silk, cotton goods and leather—probably also on damp wood; special attention should therefore be paid to any wood-work with which the feet of bathers may come in contact; canvas mats or pads should be abolished.

Precautions to ensure that there is no exchange of unsterilised towels, suits, bathing slippers, etc., among the bathers; all suits and towels should be thoroughly sterilised by boiling before being dried for re-issue.

It would seem that special precautions may also have to be instituted in South Africa, particularly in the large bathing pavilions of coastal health resorts.

5. *Leprosy*.—During the year 804 lepers were admitted to the various institutions, 504 males and 300 females. Of these only 16 were Europeans, the remainder being non-Europeans—chiefly Bantus, of whom there were 765. A total of 289 deaths of lepers occurred at these institutions. The number of admissions is increasing each year; even compared with last year, when there were 637 admissions, the increase is substantial. This must be attributed to a definite increase in the popularity of the institutions. The news is spreading among sufferers at large that to enter an institution does not necessarily involve life-long incarceration. It is continually being impressed on patients that the disease can be arrested and, in early cases, even cured if the treatment offered at the institutions is accepted. It is hoped that this policy will in time result in all lepers at present in hiding in native areas coming voluntarily into the institutions.

The number of patients in the institutions is shown in Table J (i), and the number of known cases remaining at their homes, at the end of June, 1933, in Table J (ii).

TABLE J (i).—LEPER INSTITUTIONS: PATIENTS THEREIN ON 30TH JUNE, 1933.

Institution.	European.		Native.		Mixed Coloured.		Asiatic.		Total.		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Persons.
Pretoria.....	73	34	451	285	75	40	5	4	604	363	967
Mkambati.....	—	—	150	102	—	—	—	—	150	102	252
Emjanyana.....	—	—	350	282	—	—	—	—	350	282	632
Amatikulu.....	—	—	175	94	—	—	—	—	175	94	269
Bochem.....	—	—	46	45	—	—	—	—	46	45	91
<b>TOTAL.....</b>	<b>73</b>	<b>34</b>	<b>1,172</b>	<b>808</b>	<b>75</b>	<b>40</b>	<b>5</b>	<b>4</b>	<b>1,325</b>	<b>886</b>	<b>2,211</b>

TABLE J (ii).—LEPROSY: CASES REMAINING IN THEIR OWN HOMES ON 30TH JUNE, 1933.

	Certified and Awaiting Removal to Leper Institution.	Home Segregated.	Probationally Discharged from Leper Institutions.		Total.
			Still under Surveillance.	Released from Surveillance.	
Cape (Province proper).....	—	2	149	159	310
Transkei.....	32	1	520	182	735
Transvaal.....	2	1	404	184	591
Natal.....	8	2	345	153	508
Orange Free State.....	—	—	82	38	120
<b>UNION.....</b>	<b>42</b>	<b>6</b>	<b>1,500</b>	<b>716</b>	<b>2,264</b>



The policy of probationally discharging cases classified as "arrested and non-infective" continues to give most satisfactory results. Of 2,973 lepers who have been discharged since the policy was initiated in 1923, only 257 have had to be re-admitted subsequently owing to recrudescence. The patients discharged under this scheme are carefully supervised by the Magistrate and District Surgeon of the area, so that at the least suggestion of recrudescence they can be returned to the institution for further treatment. The danger of infection being spread by such probationally discharged lepers is negligible; on the other hand, the good they do in the way of propaganda—by spreading the news among fellow sufferers that treatment at an institution not infrequently results in arrest of their lesions—is of inestimable value.

New methods of treatment are continually being tried at the institutions. The intradermal treatment of leprotic lesions with the ethyl esters of chaulmoogra oil has now become the most popular method of routine treatment; in those cases with only skin lesions the improvement has been striking, the treated lesions becoming arrested within a very short period. It is unfortunately still true that most of the patients are admitted to the institutions in a late stage of the disease, when treatment cannot be expected to yield good results. The policy of the Department to popularise the institutions should here also be beneficial in time, by encouraging patients in the very early, and therefore tractable, condition of the disease to present themselves for treatment.

At the last meeting of the Leprosy Advisory Committee, held at Pretoria on 6th December, 1932, attention was drawn to previous resolutions passed in 1925, 1927 and 1930, reading as follows:—

1925: "That this Committee recommends the appointment of a suitable medical officer to carry out a Leprosy survey of the Union, beginning with the Transkei, utilising the assistance of Magistrates, District Surgeons, Police, and other Government officials, Native organizations, Chiefs, Headmen, School-teachers, the Churches and Missions, and all other available agencies. The Committee considers that such survey should be arranged so as to be completed within about a year or eighteen months."

1927: "This Committee learns with considerable disappointment that its previous recommendation regarding the appointment of a Leprosy Research Officer for the Union has not been given effect to, and that no financial provision has been made in this year's Estimates for such an appointment. In view of the Leprosy position in the Union and the pressing need for further investigation and research, and bearing in mind the great reduction of expenditure on leprosy in the Union effected in recent years, this Committee re-affirms its resolution of 24th June, 1925, and earnestly urges that such an appointment be made as soon as possible."

1930: "This Committee considers that systematic research work in leprosy should be organized and maintained at the West Fort Institution, Pretoria, and that all necessary facilities therefor should be provided."

Effect has been given to these resolutions by the appointment of Dr. H. v. R. Mostert at the Pretoria Leper Institution.

During the year demonstrations were arranged at the Pretoria Leper Institution for parties of medical students from the Universities of Capetown and the Witwatersrand, and also for the District Surgeons who attended a post-graduate course at the latter University. Such demonstrations also have propaganda value, resulting in the influx of early, tractable cases into the institutions.

Professor De Langen of Batavia, spent several days at the Pretoria Institution in May. His visit was of considerable value; among other things he made the Medical Officers of the Institution conversant with his technique for demonstrating the presence of *M. leprae* in the blood. Although the presence of bacilli is readily demonstrated in the blood of nodular cases, they have so far proved singularly difficult to demonstrate in the blood of macular cases. This makes proof of the actual presence of infection difficult. Laboratory work with a view to demonstrating more easily the presence of bacilli in such cases is proceeding.

6. *Malaria*.—The incidence of malaria during the past summer and autumn was very considerably less than during recent years. The lessened incidence was particularly evident in Natal, where the communities that suffered most severely last year were particularly appreciative of the relative freedom from the disease this year. Such appreciation was pathetically expressed at the annual Hindu religious celebration at Isipingo, which attracts devotees from all parts; the attendance was unusually large and many thanksgiving offerings—in the form of goats, poultry and fruit—were brought to the goddess who had "smiled on them" and thus willed their protection from malaria. The lessened incidence of the disease must be attributed very largely to the climatic conditions, but some credit may be taken for the vastly improved measures of control that have been introduced. These modern measures based on scientific research are rapidly proving their value; it is only during recent years that such measures have been applied in the Union. Previously, very little accurate knowledge was available regarding the actual species of mosquito responsible for the spread of the disease locally. It was argued here, as elsewhere in the world where malaria occurs, that general measures directed against the mosquito would adequately protect communities; and here, as



elsewhere, serious failure resulted. The contrast between the old measures and the modern measures based on local research was well illustrated at Panama; the failure of the French was due to the former, while the Americans succeeded because their preventive measures were based on a careful study of the local mosquito vectors of malaria.

The first accurate research regarding the vectors in South Africa was carried out by Ingram and de Meillon. These workers demonstrated that the only local anophelines of importance in the conveyance of malaria to man were *Anopheles costalis* (gambia) and *Anopheles funestus*. They also did valuable work with regard to the breeding-places of these incriminated species. Little attention was, however, paid to these important findings; the old general, ineffective measures were persisted in until Professor Swellengrebel's arrival two years ago. His visit gave a great impetus to the anti-malaria campaign, though there is much work yet to be done in order to educate the rural population as to the principal facts.

Malaria campaigns must be directed against the mosquito, the larva as well as the adult, and against the malaria parasite within the blood of man. The relative importance of these various factors must be evaluated locally by malariologists engaged in active research; local conditions must guide the malariologist as to whether larvicidal, anti-adult or anti-parasitic measures should be concentrated on more particularly.

Research already carried out in South Africa has demonstrated that the greatest risk of contracting malaria is in the house; the adult mosquito vectors actually within buildings are responsible for most, if not all, human malaria. It is thus evident that complete immunity from malaria is possible in the most malarious areas if the adults of the incriminated mosquito species can be prevented from biting persons in dwellings. The measures necessary for effecting this consist of screening of houses, the use of bed-nets, insecticides and repellent smears, wiping of furniture with paraffin rags, and removal of furniture away from walls to allow of easy access. Such indoor protection against adult mosquitos must necessarily be systematically and intelligently carried out to be effective.

That such measures can be completely successful even in our most intensely malarious areas, has now been proved on various farms and estates. One commercial citrus area, situated in an *A. funestus* terrain and adjoining a native location, the inhabitants of which are intensively infected with the malaria parasite, may be quoted as an example. These estates employed approximately the same number of Europeans during 1932 and 1933. During the latter year careful anti-adult measures were taken, with striking results. During the year ended June, 1932, the number of working days lost by employees on account of malaria was 325, while during 1933 the number was only 107. During the latter year, three times more was spent on insecticides than during the previous year; the cost could probably be considerably reduced with better organisation and greater experience, but in any case the expense was vastly less than it would have been if a similar amount of protection had been aimed at by larvicidal methods. On these estates measures directed against the malaria parasite also assisted; these consisted in the sufficient and efficient medical treatment of sufferers, which reduced the number of human carriers of the parasite.

Since such good results are possible in hyperendemic malaria areas, it is obviously possible for the population of less dangerous areas similarly to protect themselves at little expense. As further instances of such successful anti-adult measures, may be cited the efforts of individual farmers in other intensely malarious areas.

The importance of anti-mosquito work in the house cannot be too greatly stressed. It can be confidently stated that the salvation of the rural population of malarious areas will depend almost entirely on the careful application of these measures.

It must not be inferred from the above that the importance of anti-larval field work is being relegated to the background; on the contrary, this work last year received a tremendous impetus as the result of the publication by Dr. de Meillon of a "key" to the identification of the South African malaria vectors. This has shown that anti-larval work is more easily carried out in *costalis* areas. In these areas more effective and thorough work is possible; in *funestus* areas, on the other hand, the larvicidal work is much more difficult. *Costalis* breeding-grounds, being mostly in exposed vegetation-free areas, rarely need any preliminary attention, and can be dealt with cheaply by the direct application of larvicides or by more permanent measures. *Funestus* breeding-grounds require considerable preliminary attention, because of the necessity for the complete removal of vegetation before an efficient larvicidal attack can be instituted. On the estates above referred to, thorough anti-larval work would have entailed clearing away vegetation and trimming the banks of irrigation canals, dongas and spruits for many miles, before anti-larval oil could have been satisfactorily applied. The cost of maintaining such clearing along water-courses would have been very high. Financial considerations, therefore, obviated any attempt at utilisation of larvicidal measures on these estates.

The results of the control measures on these estates, which have been guided and carefully followed by the malaria officers of the Department, are very encouraging. It is clear that similar results could be obtained in other *funestus* regions, such as Zululand. Anti-adult work is becoming increasingly popular, because of its obvious effectiveness in areas where larvicidal measures prove too costly.

The farmer's attention should be directed to the danger lurking in his own home and in the dwellings of his labour staff. Much propaganda in this direction is being done amongst the inhabitants of the sugar belt; farmers are being urged to pay greater



attention to the state of their employees' housing. The larger sugar estates are responding well ; it is being realised that better housing conditions are economically sound, because of the greater ease with which employes can be protected from infection.

Measures directed against the malaria parasite in the human body are also proving of great value. In this connection the medical profession in the malarial areas takes a very important place. Only certain of the individuals suffering from malaria can infect mosquitoes, namely, those who have particular forms of the malaria parasite circulating in their skin-blood : such individuals are known as "carriers." This carrier state does not develop if patients are efficiently treated, but the condition is very liable to develop in badly treated individuals who have frequent relapses. Persons who take quinine intermittently merely to relieve the immediate symptoms, are a constant danger, because of their liability to infect a biting mosquito. The medical practitioner, by eradicating the parasite from his patients by means of adequate treatment, will greatly assist in our campaign. On the whole, the profession is showing increasing interest in the treatment of the disease and is realising its responsibility in the national prevention campaign. The medical and entomological officers of the field staff at Tzaneen have taken every opportunity of bringing this aspect of the work home to District Surgeons, Railway Medical Officers, and other practitioners in malarious areas. They drew up a standardised system of treatment incorporating all important recent work. The object of this was to co-ordinate the various systems of treatment and discard worthless elements. The system of treatment aimed more particularly at eliminating the development of the carrier stage. The suggested line of treatment has been adopted officially by the South African Railways & Harbours Administration for all railwaymen suffering from malaria. A season's trial of this system of treatment has proved more than gratifying ; it has been adopted by many practitioners other than the medical officers of this and the Railway Department.

To eliminate the danger of the human carrier of malaria, other more direct means have also been adopted. Some success has followed the extensive use of the drug Plasmoquin in small doses on certain of the tea plantations in Assam and rubber plantations in Liberia. It has been shown that 0.15 gram Plasmoquin is sufficient to inhibit the development of the parasite when taken from the body of man into the stomach of the mosquito. Such measures are, therefore, also being applied locally.

Where human hosts cannot be treated *en massa* by means of drugs, they can be kept at a distance from uninfected persons ; the safety zone necessary is about three-quarters of a mile. This measure is largely employed in the Transvaal rural areas, where protection is attained by housing the natives who constitute the reservoir of the parasites, at a distance from the Europeans.

There is still much apathy to be combated. The complacent attitude in many homes is only disturbed by a death from malaria ; in homes so stirred, visits by members of the malaria staff prove of great value, but on the whole, progress is slow and is often retarded by great poverty. The obvious improvement in the health of those families who do carry out preventive measures is becoming an object lesson to neighbours. This has been forcibly brought home to farmers in the Piet Retief area, around the Pongola Irrigation Works ; here, the comparative absence of any malaria on the works has opened the eyes of the surrounding farming population, who have long accepted malaria as an unavoidable evil. They now see what can be done in an intensely malarious area, and are realising that it is within the financial range of every small farmer to keep malaria at bay, provided he is willing to take the necessary trouble.

Further experience in control measures in rural areas has taught all workers that, bearing in mind the fact that malaria is contracted chiefly in the home, the most important measure for the isolated farmer is efficient anti-adult work ; this is carefully described in the Department's pamphlet—465 (Health). In a *funestus* area, very few individual farmers have the financial means necessary for coping with malaria by purely anti-larval measures. In *gambia* areas anti-larval work is, on the whole, easier than anti-adult work.

The happy relationship between medical practitioners and the field staff at Tzaneen is developing. Medical men are realising the importance of accurate diagnosis by means of blood-smears, in order to achieve better treatment results and eliminate the various confusing diseases that occur in sub-tropical regions. There is, for example, a considerable amount of tick-bite fever, which very few newcomers to the Lowveld escape ; this has, in the past, commonly been diagnosed and treated as malaria, but enlightenment is spreading—with obviously beneficial results.

*Tzaneen Field Station.*—In accordance with the recommendations of Professor Swellengrebel, a Malaria Research and Field Station has been established at Tzaneen in an intensely malarious area. The research section of the Station is under the immediate control of the Entomological Department of the South African Institute for Medical Research. This works in close co-operation with the Control Section, which is administered by this Department. The valuable research work which is being carried out at this station is indicated by the report of the Entomologist which is published as an annexure. The Malaria Medical Inspector of the Department (Dr. Anneke), is in charge of the malaria control work. He has a field inspecting staff of three qualified inspectors specially trained in malaria work, and two lady health visitors. The duties of this staff are primarily to teach the inhabitants of the Transvaal rural areas the facts regarding malaria. The lady health visitors, in addition to anti-malaria education, pay attention to the important associated subjects of mothercraft, child welfare and domestic hygiene.



During the past season the staff has been able to operate further afield; the areas worked in are Zoutpansberg, Potgietersrust, and Waterberg. The Zoutpansberg area consists mostly of occupied farms lying along rivers; it is situated largely behind the Zoutpansberg mountains, where the climate is very dry—with an average rainfall of 12" to 15" per annum. But it is so situated that a succession of good rains causes the spread of *A. costalis* over the entire area in a very short period. This is due to the numerous rivers in the area; thus, the heavy rains of January brought about extensive breeding of this mosquito in February.

The Potgietersrust area lies to the north-west of the town, but includes also the important citrus estate of Zebediela—20 miles south. The most thickly populated part of the district lies along the Limpopo, Magalakwin and Palala rivers. The inspector in this area also gave advice to the foot-and-mouth disease cordon.

The Waterberg area is densely populated along the Limpopo, Palala and Magol rivers, and this is where most of the work has to be done; it is a huge tract of country.

Torrential rains fell throughout the Transvaal during the third week of January. The inspectors reported during February that *A. costalis* was breeding in the three districts above outlined, in pools in the riverbeds. All that was now needed for this mosquito to spread extensively throughout the districts was a succession of pools; fortunately, however, such a chain of pools was not produced, as very little rain fell during February, March and April. *A. costalis* breeding could, therefore, not spread and was limited to the river-bed pools and permanent water-courses; malaria consequently remained localised throughout the season. But the country was clearly on the brink of an epidemic of malaria over a very wide area. This was indicated by the findings of inspectors in the field subsequently. The stage was set in February for widespread *A. costalis* breeding, with the inevitable sequel of a malaria epidemic. The reason this epidemic did not develop must be attributed to the rapid drying-up of water in the Middelveld districts. Immediate action was taken by the Malaria Medical Inspector early in February, so as to be prepared for the possibility of a malaria epidemic. He visited the districts, warning all officials and inhabitants to lay in adequate stocks of quinine. Stocks were strategically distributed in each district; the organisation was such that quinine in sufficient quantity was available approximately every 20 miles.

The inspectors continued operating in the field until the end of May; thereafter they were used in connection with the research work of the Station. They have proved of great value in the examination of blood-smears, dissection of mosquitoes, and other aspects of research work in progress. They are responsible for the collection of practically all the field material on which the entomologist works.

The lady health visitors are kept continuously busy in the field. It is hoped to settle them at strategic points in rural areas; satisfactory positions are, for instance, where schools have boarding-houses attached. One health visitor has already been so located at Mokeetsi, where she is doing excellent educative work in the direction of mothercraft, child welfare and hygiene—particular stress at all times being laid on the preventive aspect of malaria. Other points at which it is hoped to station health visitors are Alldays (Zoutpansberg) and Maasstroom (Potgietersrust). At these places the boarding of children is centralised. In this way it is hoped to inculcate in the minds of growing children the principles of healthy living, balanced dietaries, and the facts regarding the prevention of disease.

The four native "spotters" have proved very useful; they accompany inspectors on long tours, taking their bicycles with them so that they are able to work independently supplementing the inspectors' findings in each area. In times of epidemic stress these spotters will serve a useful purpose in locating the spread of *A. costalis* from place to place.

Investigation of the efficacy of new drugs cannot be satisfactorily carried out at the Station, on account of the lack of facilities. Nevertheless, the drug Atebrin is being tested. It is a definite parasiticide; it acts on the asexual cycle of the two malaria species found in the Union (subtertian and benign tertian), and the sexual cycle of benign tertian, but it has no effect on the gametocytes of subtertian malaria. This finding corroborates those of workers in other parts of the world. The parasites disappear from the peripheral blood on the third or fourth day of treatment. A careful record is being kept of the parasitology of patients under treatment, and each case is kept under observation as to possible relapses.

There are now available three specific anti-malaria remedies—quinine and the two synthetic preparations, atebrin and plasmoquin. As the Malaria Commission of the League of Nations points out in its Third General Report, these more recent remedies must not be regarded as being substitutes for quinine, but as additional weapons for use in particular circumstances and for special purposes. Each of the three specific drugs has its own particular action on the malaria parasite at some phase in its life cycle. It is thus bad practice to treat attacks of malaria in the acute stage with a combination of two of the specific drugs, in the hope that one of them may cure the attack and the other prevent relapses. For treating primary attacks of malignant tertian malaria, atebrin has been found much more effective than any other known remedy. Three tablets of 0.1 gram each should be given daily by the mouth for from five to seven days. Up to six tablets can be given on the first day with safety, if desired. Where oral administration is impracticable—as, for instance, with severe vomiting—the drug can be dissolved in normal saline and administered intravenously or intramuscularly.

Relapses continue until the human defensive mechanism has acquired sufficient power to overcome the parasite. For this reason, persons over-treated at the first onset of fever in primary and subsequent attacks, do not acquire sufficient defensive power to prevent relapses. Such cases tend to relapse monthly for a very long period. While it may



be unsafe in the primary attack to withhold drugs for a day or two, this can and should be done in the first and any subsequent relapses. Treatment of relapses does not therefore start until after the primary attack. With malignant tertian malaria, the Commission considers that it is justifiable to endeavour to sterilise all the parasites by specific drug therapy during the first recrudescence. Quinine, if not used during the primary attack, should be used for this purpose. If treatment during the first relapse does not prevent further relapses, then treatment of the next relapse should be delayed as long as possible to allow of the physiological defensive mechanism being developed.

The further aim of treatment is to prevent spread of the disease. For this reason the gametocytes, or sexual forms of the malaria parasite, in the human peripheral blood must be destroyed, as they are the only forms which are capable of continuing the life cycle of the parasite in the mosquito. They do not appear in the blood during the incubation period, nor until about ten days after the onset of the first symptoms. Modern work has shown that gametocytes are most numerous in recent cases of malaria. Their appearance is a sign that the patient has not yet acquired an effective defensive power. Gametocyte therapy should therefore only be applied to actual carriers of gametocytes. Quinine and atabrin are apparently incapable of destroying the gametocytes of malignant tertian malaria; plasmoquin, on the other hand, appears to have a direct action on the crescents.

The recommendation of Professor Swellengrebel regarding the malaria education of teachers is already being carried out to some extent. Seven headmasters of Lowveld schools attended at Tzaneen during January; it is hoped to hold annual courses of this nature for teachers. The whole of the South African Railways & Harbours anti-malaria staff attended a course at the Station during July. A further course for Health Inspectors of Transvaal local authorities was held in January, but the attendance was disappointingly poor. The resident anti-malaria staff of the Pongola Irrigation Scheme was trained during October and November, and put on the field by this Station. Officers of this Department also received training at Tzaneen prior to being sent out on anti-malaria work. Many other visitors and local residents received instruction from time to time in the laboratory.

A propaganda tour, during which the Department's malaria film was exhibited, was carried out by the Malaria Medical Inspector over the malaria areas of the South African Railways & Harbours Administration in the Transvaal, Natal and Zululand, during September and October. In addition, this officer addressed meetings of Farmers' Associations in various parts, explaining and stressing the importance of anti-adult measures as described in the Department's pamphlet—465 (Health).

*Anti-Malaria Organisation in Natal.*—The Government staff employed in Natal for combating malaria consists of two Assistant Health Officers (one of whom devotes practically all his time to this work), three European malaria inspectors, one Native Affairs Officer seconded for anti-malaria work in the Native Reserves, forty-seven Native malaria assistants, and seven Native sprayers and quinine distributors. In addition, all the Local Authorities in the malaria belt employ officers for this work as will be shown later.

*Natal Native Areas.*—The most striking reduction in the incidence of malaria occurred in the Native areas in Natal. This was due primarily, here as elsewhere, to climatic factors. Of considerable importance also were increased resistance of the population as the result of previous infection, the more general use of quinine, and the gradual adoption of approved methods of nursing and feeding. Despite the lower incidence, the affected area remained as large as in the previous season—in fact, there were some active outbreaks on the outskirts of the previously infected area. There appears, therefore, little sign of reversion to the conditions obtaining prior to the 1929 epidemic, when malaria first began to spread beyond its normal geographical limits.

Notable advance has been made in anti-malaria education and propaganda among the Natives. This is an essential preliminary to all active measures for combating the disease. In addition to visits to kraals carried out by the native malaria assistants, courses of lectures illustrated by means of lantern slides, extending over one or two days, were given to officials, missionaries, storekeepers, and also to chiefs, native ministers, evangelists, teachers and other enlightened natives. Such courses were given at twenty-seven centres. The total attendances were 117 Europeans and 2,148 Natives. A ten-day course of training was given to forty-one native malaria assistants and forty "spotters." A five-day revision course was attended by twenty-five native malaria assistants, and a special five-day course by fifty selected native teachers.

In anticipation of a recurrence of last year's epidemic, tentative arrangements were made for various mission bodies to establish temporary hospitals with the assistance of the Department; fortunately, the disease did not develop sufficiently for these arrangements to become necessary. To obviate having to resort to hospitalisation, outbreaks, when reported, were dealt with locally by quininisation of patients and insecticidal spraying of huts. Sixteen localised outbreaks—in the Eshowe, Mapumulo, Stanger, Ndwedwe, Pinetown, Greytown, Umzinto, Port Shepstone, Camperdown, Msinga, and Weenen districts were dealt with in this manner, with most satisfactory results. In a few instances local native labour was employed; in others the work was done voluntarily, under the guidance of native malaria assistants.

Hut-spraying as a means of combating malaria is much appreciated by the natives; wherever it was instituted an insistent demand for its further use was made. In the Msinga district insecticide was provided by the Local Council for the use of the natives, who purchased no less than 150 hand-sprayers.



Anti-larval work was carried out by the Msinga Local Council over the native irrigation works in the Mooi and Tugela valleys.

The success of these measures and the example of similar work on farms adjoining Native areas, combined with the intensive propaganda carried out, have led to an increasing demand for the general application of anti-larval measures. This is indicated by the anti-larval work which is being carried out voluntarily by natives in several localities. Such efforts, however, have proved to be of little real value unless officially guided and controlled.

*Natal Inland Rural Areas.*—Malaria prevention work was conducted over a much wider area than in previous years. Prior to the epidemic of last season, malaria existed along the inland courses of the larger rivers. Its spread early in 1932 to the highlands was not anticipated; the population in those areas were consequently taken unawares, possessing neither the necessary knowledge nor organisation for the successful combating of the disease. Educational propaganda was therefore found to be necessary among the farming communities in the areas which had become heavily infected. To this end the European inspectors were delegated to visit individual farmers throughout the midland districts between Camperdown and Greytown, during the winter months previous to the last malaria season. Thereafter a series of lectures to all Farmers' Associations, members of Women's Institutes, and Local Authorities in the midland and highveld districts east of the Drakensberg, were given in September by an Assistant Health Officer; seventeen meetings were addressed, and the malaria cinema film of the Department was shown at all the larger centres.

A scheme of voluntary farm groups was initiated in the midlands; this resulted in the formation of twenty-eight groups, embodying a total of 284 farms. The principle of employing trained natives as "spotters" was adopted by these groups; this necessitated the training by the Department of forty natives to meet requisitions by newly formed groups. Of the number trained, thirty-one have been employed by farm groups or local authorities, who in addition employed fifty Native or Indian sprayers. Considerable effort was expended by officers of the Department in keeping these groups alive and interested in the work. The cost of malaria prevention incurred by these voluntary farm groups amounted during the season to approximately £550—an average of just under £2 per farm. Thus, the Harburg group, which operated successfully from the beginning of January to the end of May, protected thirty-two farms at a total cost of £55. This gives a fair indication of what can be accomplished by co-operative voluntary effort at little cost to the individual.

Adjoining these farms is the Impolweni Mission Station with a native population of approximately 1,500, which undertook extensive anti-malaria measures. It concentrated on larvicidal and anti-adult work, and the treatment of carriers by means of quinine and plasmoquin; the cost of these measures amounted to £158, and was borne by the Church of Scotland Mission. Even allowing for the better climatic conditions, the effectiveness of the measures was indicated by the fact that the deaths reported on this mission last season were only four, as contrasted with ninety-seven in the previous season.

The inland municipalities and town boards between Richmond and Ladysmith all carried out malaria prevention measures; a member of the staff of each was delegated to attend a 5-day course of instruction at Stanger in November, and throughout the season the Department's staff kept in close touch with these officials. The extent of co-operation is shown by the fact that (excluding Pietermaritzburg, where an active organisation functioned under the Medical Officer of Health) over £1,000 was spent by seven authorities solely on this work.

A gradual extension of the co-operative action already started in the midlands is contemplated in those districts where, owing to limited staff, active propaganda was only possible over some sections. The control of labour farms, such as those situated along the upper reaches of the Tugela and its tributaries, is difficult; these farms have been a source of trouble to the Magistrate and the Department, especially in the Weenen district, during the past three years, in spite of the very severe infection that occurred. Continual representation to several owners has, however, resulted in an effort being made by some at preventive work; it is hoped that this may in time act as an incentive to the others.

*Coastal Local Authorities.*—Professor Swellengrebel laid great stress on the importance of local administrative units for the supervision of anti-malaria work. The constitution of such local authorities falls within the sphere of the Provincial Administration. The Health Committees Ordinance of 1930 provides for the constitution in specified areas of health committees charged with the duties imposed on such local authorities by the Public Health Act of 1919. It was considered, however, that the functions and duties of health committees covered too wide a field when only anti-malaria work in rural areas was contemplated. A Health Committees (Malaria) Ordinance was accordingly passed by the Natal Provincial Council in June, 1932, which empowered the Administrator when constituting a health committee under the existing Ordinance to declare that its duties should be restricted to measures for stamping out and preventing malaria; such a committee is known as a malaria committee. The organisation of such committees throughout the length of the Natal Coast was carried out expeditiously.

Apart from the pre-existing local authorities, the newly constituted organisation of the sugar belt now consists of 15 malaria committees—6 on the North Coast of Natal, 3 on the South Coast, and 6 in Zululand—and 3 health committees for the hitherto uncontrolled seaside resorts on the South Coast. The area which has been brought under control by this new organisation is approximately 250 miles in length and 1,000



square miles in extent. Occupying four-fifths of it are over 600 European sugar farms and numerous smaller holdings. It is fringed by native reserves throughout the whole of its length, and enclosed in it are also some isolated reserves.

The local regulations for malaria committees promulgated by the Administrator define "mosquito" as *Anopheles gambiae (costalis)*; restrict the area of anti-mosquito operations to a half-mile radius around human habitations; and provide for the enforcement, where necessary, of anti-adult in addition to anti-larval measures.

The organisation of malaria committees was carried out systematically on a regional basis; this allowed of the training of the necessary staff being undertaken by this Department immediately after each batch of committees was gazetted. Four courses, of six days each, were held in September, October, November, and January; these were attended by the personnel of the newly constituted committees, as well as representatives from other local authorities, and sugar mills and estates. Some 50 Europeans presented themselves for training at these courses; of these, 23—including several certificated sanitary inspectors—subsequently found employment with local authorities or on sugar estates. The committees were encouraged to make appointments of malaria inspectors on a permanent basis; in most cases this was done. This is necessary to ensure continuity of supervision. Much valuable and even essential work requires to be done by the inspector in winter—educative propaganda among the poorer classes; the detection of permanent breeding foci; the abolition of difficult areas by permanent measures such as drainage; drainage and tree-planting to abolish permanent seepages; fencing to exclude cattle from marshes; and improvement of housing conditions to prevent access of mosquitoes. The success of these undertakings depends almost entirely on the goodwill and co-operation of the resident population. Hence, the closer a competent man comes into touch with the population of his area, the simpler and more effective will the supervision of anti-larval measures ultimately become.

Most of the time of the inspectors is taken up with propaganda. Under the Public Health Laws of the Union the owners and occupiers of land are responsible for carrying out anti-mosquito measures for the prevention and control of malaria; local authorities are required to see that these duties are carried out, and to co-ordinate and assist such efforts. Every owner must therefore be visited and the necessary measures carefully explained to him; he must be told what implements and materials to use, how to use them, their cost and where obtainable, and where and at what intervals to oil. For effective control it was found necessary that each inspector should cover the whole of his areas at least once a week. Owing to the extent to be covered (usually about 30,000 acres) it is not possible for him to check all the work of each individual, but a sample of the work carried out by each owner can be inspected. The experience gained last season should greatly facilitate the work of inspectors in the future, more especially if the progress which has already been made in the direction of permanent measures for the control or abolition of breeding-places is maintained.

The committees were advised to make the systematic search for mosquitoes in dwellings, especially in Indian and Native compounds, a part of the daily routine of their inspectors. This serves as a valuable check on the efficacy of anti-larval work. Dry weather often caused all obvious breeding places to disappear, but that breeding was still taking place was indicated by the presence of mosquitoes in dwellings. The finding of mosquitoes in habitations has led also to the discovery of uncontrolled breeding in out-of-the-way places or in undetected hoof-marks, which would otherwise have escaped attention. Had the inspectors in these instances confined their supervision to oiling operations, to the neglect of house examinations for adult mosquitoes, they would have left the areas without realising that an outbreak of malaria was imminent, although the anti-larval work had every appearance of being satisfactory. Such an occurrence would undoubtedly have discredited the policy of species sanitation advocated by this Department as well as the reputation of the inspector.

The routine search for adult mosquitoes in dwellings also serves other useful purposes. It allows of a fairly intelligent forecast being made of the probable course of events during the ensuing month. It also makes possible fairly accurate discrimination between relapses of the disease contracted during a previous season and new infections, by regarding all cases associated with the presence of *costalis* in dwellings as re-infections. This is a matter of considerable practical importance in view of the fact that following the epidemic of last year there was a general tendency among members of the public to regard every symptom of fever in a person who had previously suffered from the disease as a recurrence, which did not therefore indicate faulty hygienic measures.

Search for mosquitoes as part of the daily routine is desirable also for keeping officials informed of the species present. This was indicated by an important observation regarding *A. funestus*. It was, of course, known that this mosquito occurs in Natal; but it had not been considered of much importance as a vector of malaria. Last season, however, it was found to be associated with a prevalence of the disease on the Umfolosi Flats in Northern Zululand. Investigation as a result of this observation revealed that it was breeding extensively among the reeds and papyrus roots along both the outer and inner edges of the belt of vegetation surrounding the marshes and islands of the Lower Umfolosi. This finding necessitated some alteration in measures. Anti-larval work in the Umfolosi area holds out little prospect of success during the wet season; drainage of the extensive swamps is beyond the means of the population. The advice given, therefore, was not to worry overmuch about oiling except where *A. gambiae* were obviously breeding in the vicinity of homesteads, but to confine attention to mosquito-proofing and spraying of dwellings of Europeans and Natives.



It can be claimed for the efforts of the past season that good foundations have been laid on which to build. The activities of the malaria committees and their staffs have exceeded expectations. To them must be attributed, in considerable measure, the fact that the incidence of malaria was well below the usual seasonal prevalence of inter-epidemic periods. That this low incidence is not to be attributed solely to climatic conditions is evidenced by the fact that in areas where anti-larval work was carried out in a manner considered unsatisfactory, malaria prevalence always occurred. On certain small holdings in the Tongaat area there were 73 cases of malaria, with 3 deaths, among a population of 92. Many other similar instances can be quoted. Where, on the other hand, satisfactory control was maintained from the outset, the incidence was negligible. Though water-puddles hardly occurred, the dry weather and the want of pasturage for cattle resulted in breeding to a much greater extent than usual in hoof-prints in marshy areas and in river-beds. To such an extent did this occur in the Umvoti Mission Reserve and other areas, that effective control by anti-larval measures was rendered well-nigh impossible owing to the movements of cattle.

Much permanent work with a view to eliminating troublesome breeding-places was done, not only by the larger communities but by Indian small-holders. The anti-larval measures were carried out on a larger scale and much more efficiently than in previous years. In spite of the dry weather, the sale of anti-malaria oil was more than double that of last year. It was significant that whenever the efficacy of new larvicides or insecticides required to be tested by officers of the Department, they had to resort to uncontrolled areas.

The malaria committees are justly entitled to recognition for the part they have played since their establishment; it would be disastrous, however, were they to allow themselves to be lulled into a false sense of security by the results of their efforts during the present season.

The anti-mosquito work done by coastal local authorities other than the malaria committees was, in general, much more conscientious and effective than in previous years. Nevertheless, much more must yet be done by most of them before their areas can be considered quite safe for visitors. Many of these areas applied to the Department to give them clean bills of health. This could clearly not be done during the malaria season; prospective visitors would have been misled as to the risk, very slight, admittedly, in some of the areas, to which they would be exposed.

*Durban.*—The Corporation of Durban calls for special mention because of the extent of anti-mosquito work that was done during the year. A greatly enhanced staff was continuously at work on mosquito control, and permanent measures for dealing with the mosquito nuisance are being carried out. Major engineering works are now in process of construction. Reclamation of the Eastern Vlei is proceeding; eventually the level of this troublesome vlei will be raised throughout its extent to a level of 11·5 feet above L.W.O.S.T. This will permanently eliminate breeding-places. Training and reclamation of the Umbilo River is being carried out; the river will be confined to a definite course, levees constructed, and portions of the river-bed beyond the levees reclaimed. A concrete flume is being constructed at Congella. The run-off between Congella and the Umbilo Flats is being canalised by confining the water in a broad concrete-lined canal—the banks of this canal being reclaimed; a third of the capital cost of this work is being borne by the Railway Administration. In addition, reclamation at the head of the bay is being undertaken by the Railway Administration; this forms part of the harbour extension scheme of the Congella Works.

The completion of these works and the continued activity of experienced anti-malaria staff will, in time, reduce malaria in the area of this large local authority to a minimum.

Meanwhile, the conditions which obtained in the Borough area during the past summer caused considerable anxiety. Dipping for larvae revealed an abundance of *A. costalis* throughout the summer months. *A. costalis* larvae were first collected in September, 1932, in the Umgeni Valley in the Springfield area. Thereafter, in spite of the use of larvicides by the Corporation, they continued to be found until well after winter had set in. For some months the Springfield area only was responsible for larvae of the vectors, but towards the end of November they were found in brickfields in the Mayville area. They then appeared in large quantities in insolated spots on the Umlaas River. In January, they were found in the vicinity of Wentworth Station, on agricultural plots farmed by Indians. During February and March they were found at Umgeni, Durban North, Eastern Vlei, Mayville, Umbilo River, Umhlatuzana River, Wentworth, Umlaas River and South Coast Junction. Thus, all the outside areas newly added to the old borough were hatching the malaria vector, while within the boundaries of the old borough breeding-grounds occurred at Umgeni, Eastern Vlei, and the Umbilo River. In the whole of the Greater Durban area, only the Berca and the Congella area were therefore free of potential infection, if an effective flying range of half-a-mile on the part of mosquitoes is assumed. Adult *A. costalis* mosquitoes were actually caught in dwellings in fair quantities at Umgeni, in the Point area, and on the Bluff near Wentworth.

Malaria was fairly prevalent from Churchill Road Halt, throughout Stamford Hill, and in Durban North—especially near the banks of the Umgeni. Native and Indian dwellings are situated on the banks of this river; with the heavy breeding which took place, it appears clear that large numbers of vectors become infective, accounting for the subsequent spread of malaria. That the Umgeni was the focus of infection is amply borne out by the fact that houses close to it were the most heavily infected, while cases grew progressively less with increasing distance from the river.



The spread of malaria in Durban last season could thus be traced to breeding in river-beds, and in low-lying areas where the underground water-level reaches close to the ground surface. As elsewhere in Natal, little breeding occurred in rain-water puddles because of the low rainfall. Malaria control thus resolved itself into treatment with larvicides of the major river-beds—the Umgeni, Umbilo, and Umhlatuzana. Treatment was also necessary on the Eastern Vlei and the Wentworth Flats, as well as on various small collections of water. Control was effective in most cases, except where it broke down hopelessly on the Umgeni River and, to a less degree, on the Wentworth Flats. Had the Umgeni River been adequately treated, malaria control would have been vastly more effective.

*Railway Areas.*—As recommended by Professor Swellengrebel, a medical officer in full-time charge of anti-malaria measures was appointed by the Railway Department. This officer (Dr. C. G. Booker) is assisted by a European staff consisting of, in the Transvaal, 1 sanitary inspector and 4 sanitary foremen, and in Natal, 1 assistant engineer (whose duties include those of a sanitary inspector) and 5 sanitary foremen. The inspectors and sanitary foremen each control 5 native oilers. The inspectors and foremen were given a thorough training in anti-malaria work. At the beginning of last year they attended a course at Gingindhlovu organised by this Department; from there they proceeded to the Tzaneen Field Station to complete their training. They are equipped with Zeiss microscopes for diagnostic work, and with rail motor-trolleys to enable them to travel over their sections.

The results of the work done by this staff have been very satisfactory, as indicated by the following extracts from Dr. Booker's report, published by permission of the General Manager of Railways and Harbours:

The Administration's anti-malaria campaign covers, in the Transvaal, a section of 564 miles of railway line, protecting 30 stations, with a total population of 1,843 Europeans and 2,159 non-Europeans. In Natal, 418 miles of line are covered, protecting 62 stations, with a total population of 1,614 Europeans and 1,412 non-Europeans.

During the off-season (July to December), 1932, the anti-malaria staff concentrated on permanent anti-larval measures in places where the vectors had previously been found to be breeding. A constant anopheline survey was, in addition, kept up throughout; as soon as breeding commenced in any locality, active larvicidal measures were adopted. In the Transvaal, 1,045 *gambiae* and 33 *funestus* breeding-places were located, and in Natal 117 *gambiae*—making a total of 1,195 breeding-places. Most of these were completely eliminated by permanent work. Those which could not be so disposed of were treated at weekly intervals with larvicidal oil or paris green, pending their permanent destruction during the coming off-season.

Active measures were also adopted with regard to adult mosquitoes. In the affected area of the Transvaal the European railway employees occupy 206 houses; all of these were screened, with the exception of those at Waterval Boven. In Natal, the railway employees occupy 138 screened and 179 unscreened houses in controlled areas. This protection was extended to other stations where malaria conditions appeared to warrant it, e.g., at Maidstone, and at many other stations south of the Tugela.

To prevent spread of infection from the Native to the European population, native quarters were removed from the vicinity of European dwellings—where it was not practicable to protect them by means of mosquito-gauze. In general, the former plan was adopted in the Transvaal and the latter in Natal. In the Transvaal, 37 per cent. of the native quarters have been removed to safer sites; in Natal, north of the Tugela, 93 per cent. have been gauzed.

Larval control, where undertaken, was checked by systematic search for adult mosquitoes in living quarters. This measure is considered very important; it helps to assist the effectiveness of anti-larval measures and may indicate possible undiscovered breeding-places in the vicinity. Of 9,411 such surveys for adults in dwellings, *gambiae* were found in 213 instances and *funestus* in 4. Often such findings enabled the anti-malaria staff to anticipate the necessary precautionary measures—for example, at Umkomaas, Isipingo, and other places—during January and February. At Tugela the difficulties were so great that adult mosquitoes continued to be found in spite of extended anti-larval operations, and bed-nets and repellent smears, in addition to screening of houses, had to be recommended.

Until recently, the possibility of mosquitoes being carried in trains and buses received much publicity. The larger local authorities thought that mosquitoes so conveyed from malarious areas constituted a serious danger. Nowhere else in the world are trains held to be responsible for the spread of malaria, but since it appeared unwise to apply knowledge of malaria prevention in one country to another, a special investigation of such possibility was made locally. Since members of the public believed in the possibility of malaria vectors favouring train travel, it was necessary to start with the assumption that they did so travel in dangerous numbers. All coaches and buses were, therefore, carefully sprayed and inspected at convenient points, and dead and living mosquitoes collected; this procedure, introduced at the beginning of the summer, was continued into the winter. Of several thousand mosquitoes collected, only one male and two female *A. gambiae* were found; when it is remembered that only the females



transmit malaria, and that only a small percentage of these become infective, it is evident that the part played by trains and buses in the transmission of malaria need not be taken into serious consideration.

The education of railway employees in the necessity for taking measures to guard against infection is an important corollary to anti-malaria measures carried out by the field staff. The need for such education became apparent during the visits to malaria areas. Some slight reluctance to full co-operation was encountered. This was possibly based on the mistaken assumption in some quarters that the campaign primarily aimed at eliminating climatic allowances. Educational propaganda was carried out in collaboration with officials of the Public Health Department, throughout malaria areas by means of lectures and film exhibitions. The responsibilities of railway employees regarding spraying and the care of wire-screening were explained. These lectures were invariably well attended by employees and their families. They did much to remove misunderstanding and misconception regarding the campaign. Acting on the repeatedly stressed opinion of the Malaria Commission of the League of Nations as to the desirability of medical officers acquiring special knowledge of malaria control, arrangements were made with the Public Health Department for supplying this knowledge at the Tzaneen Field Station. A number of Railway Medical Officers have already availed themselves of the facilities so provided.

Little effort has hitherto been made to cure malaria permanently; employees once infected have suffered repeated relapses. Such relapses contribute to the high incidence of the disease. The anti-malaria staff is reducing malaria by reducing the number of vectors and thereby the number of infections. The Railway Medical Service is taking an active part in reducing the incidence of malaria by completely and permanently curing employees who have already acquired the disease. Treatment of the disease has been standardised on the railways into a system which has proved eminently successful in other parts of the world. Arrangements have been made to continue the treatment of cases transferred from one railway medical officer's district to another.

The anti-malaria staff has been operating in the field since the early part of 1932. The effect of their work is brought out by the figures showing the number of men off duty because of malaria, and the amount expended in sick pay during the period January to June, 1933—as compared with the same period of 1932. In the latter year, 869 members of staff were absent in this way, and the amount expended in sick pay was £3,304; in 1933, the number absent from duty was 222 and the amount expended in sick pay was £668. These figures reflect the incidence of malaria and the expenditure thereon for the whole of Natal and the Transvaal, including areas where malaria control has not yet been undertaken.

*Pongola Irrigation Works.*—Following on an inter-departmental conference on malaria held in October, 1931, the Department undertook to give advice regarding malaria prevention at the Pongola Irrigation Works. A detailed investigation of local conditions was made by Dr. Anseeke in May, 1932, and recommendations for safeguarding the population concerned were made. All the recommendations were adopted by the Department of Irrigation, with the gratifying result that malaria has been brought completely under control in this difficult area. The percentage of new malaria infections for the whole of the labour strength, European and Native, during last season was less than one percent. That this satisfactory result could not be attributed entirely to improved climatic conditions was demonstrated by the experience on neighbouring farms. Those visited had a total population of 85 Europeans and 238 Natives; of these, 48 Europeans and 119 Natives were infected with malaria. At about half these farms the houses were screened, mostly imperfectly, and some anti-adult work in the form of spraying was done, but no anti-larval work was carried out.

The health staff employed at the works on the recommendation of the Malarial Medical Inspector, consists of a medical officer, a sanitary inspector, a handyman, and natives for general sanitary work. The sanitary inspector supervises the anti-malaria work of 9 natives (2 spotters, 5 oilers, and 2 sprayers). At the European hospital a qualified nurse and a housekeeper are employed. Three natives trained in first-aid are employed at the native hospital and compounds.

For the labour camps situated in the Pongola Valley at varying distances from the Pongola River, the most salubrious spots practicable have been chosen. The white labourers, numbering a little over 200, are of the poorer classes, drawn mostly from the Vryheid and Piet Retief districts. Slightly under 800 natives are employed—Zulus, Swazis, and Mashangaans. They were difficult to control because of their habit of visiting neighbouring kraals, especially during week-ends.

The measures carried out by the sanitary inspector and his gang of 9 boys consisted of anti-adult and anti-larval work. All houses and compound rooms were mosquito-proofed, mosquito nets were provided, and a daily search made for adult mosquitoes in all sleeping quarters, which were daily sprayed with insecticidal pyagra. The two spotter boys spent their time collecting larvae and searching for fresh breeding-places. Anti-malaria oil was sprayed weekly on all known breeding-places within a mile radius of the works. Collections of water were dealt with by draining wherever practicable.

7. *Plague.*—The number of human cases of plague was small; only 31 cases with 16 deaths all in the Orange Free State were reported. The outbreaks responsible for these cases occurred in the districts of Bethulie, Bloemfontein, Boshof, Hoopstad, Kopjes, Kroonstad, Lindley, Reddersburg, Smithfield and Thaba 'Nchu.



TABLE K.—PLAGUE CASES AND DEATHS IN THE UNION DURING THE YEAR ENDED 30TH JUNE, 1933.

Province.	Number of Districts in which Outbreaks Occurred.	European.		Coloured or Native.		Total.	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cape.....	—	—	—	—	—	—	—
Natal.....	—	—	—	—	—	—	—
Transvaal.....	—	—	—	—	—	—	—
Orange Free State.....	10	7	5	24	11	31	16
UNION.....	10	7	5	24	11	31	16

Although no human cases occurred in the other provinces the presence of danger was indicated not only by extensive mortality among veld rodents in various parts, but more definitely by the recovery of plague bacilli from the carcasses of rodents in the Ermelo, Laingsburg and Clanwilliam districts.

The Department has continued its policy of urging on local authorities the necessity for anti-rodent measures particularly in the direction of rendering buildings rodent-proof. Much apathy is encountered which is readily accounted for by the absence of human cases. It is manifestly dangerous to wait for even one human case in an area to provide the necessary stimulus for precautionary measures since we are dealing with a formidable disease which may so easily assume epidemic proportions.

Though the western Cape Province is threatened by the southern advance of the wave of rodent plague infection, the only local authorities of that area that have seriously attempted to enforce the Plague Regulations and adopt anti-rodent measures are those of Capetown and the Cape Divisional Council. The Cape Peninsula and adjoining areas are threatened from two directions. In June, 1933, infection among rodents had reached a point approximately 20 miles north-west of Clanwilliam; on the Karroo side rodents have recently died out as far south as the Hex River Valley.

It is gratifying to record that vigorous anti-rodent measures are being prosecuted by the South African Railways and Harbours. On the recommendation of Dr. Booker an extensive re-organisation of anti-rodent services is being effected. Efficient rat-proofing of railway premises is now regarded as at least as important as destruction of rodents. Harbours and breeding places are being eliminated which together with destruction by means of gassing and other methods will bring about a progressive reduction of the rat population. While an improved rodent staff will be actually responsible for the maintenance of rat-proofing structures in a serviceable condition, all railway servants concerned have been exhorted to assist by taking care not to damage these structures in the course of their duties, and also to arrange for the stacking of goods in such a way as to eliminate rodent infestation. Satisfactory arrangements have now been come to for full co-operation between the officers of the Railway Administration and the Public Health Department in anti-rodent work, as is already the case in anti-malarial work.

8. *Rabies*.—That the existence of rabies infection amongst certain of our wild rodents notably the yellow mongoose and genet cat is still not realised by large sections of the community is evidenced by the distressing occurrences reported from time to time. During the year 5 human deaths from rabies occurred in the Union. A European boy of 12 years was bitten in the finger by a yellow mongoose at Vaalbank in the Heilbron District. The animal was killed and left on the veld, but the danger to the boy was not realised and no anti-rabic treatment adopted. A month later he developed symptoms of hydrophobia and died within three days. The diagnosis was confirmed by *post mortem* pathological examination. Another European male in the Brakpan district, was bitten by a meerkat, and similarly developed the disease after three months and died two days later.

Three natives, one from Senekal, one from Fauresmith and the third from Trompsburg died from rabies having previously been bitten respectively by a yellow mongoose, a wild cat and a dog. The dog's brain was pathologically examined and evidence of rabies found. How the dog became infected could not be ascertained. A dog in the Vryburg district also developed rabies, it had previously been bitten by a wild genet tabby. It is of considerable interest that with smouldering rabies so widely scattered so few dogs become infected, since the temptation for farm dogs to chase and capture sick mongoose must be very great.

A domestic cat on a farm in Brandfort developed rabies (as proved by subsequent *post mortem* examination) and bit a European. Treatment with anti-rabic vaccine was adopted and no symptoms developed.

In addition rabies, confirmed by pathological examination *post mortem*, occurred among animals in the following districts:—

Mafeking.....	1 genet cat.
Trompsburg.....	2 mongoose (one in July the other in April).
Hoopstad.....	2 mongoose (on different farms).
Edenburg.....	1 mongoose.
Bloemfontein.....	2 mongoose (one on the town lands the other at Glen).
Ventersdorp.....	1 mongoose.
Lichtenburg.....	1 mongoose.



9. *Smallpox and Vaccination*.—Twelve small outbreaks of smallpox accounting in all for 20 cases occurred during the year. These are detailed in Table L. None of the cases proved fatal.

TABLE L.—SMALLPOX : CASES AND DEATHS REPORTED DURING THE YEAR ENDED 30TH JUNE, 1933.

Province.	Number of Districts in which Outbreaks Occurred.	European.		Non-European.		Total.	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cape.....	7	—	—	13	—	13	—
Natal.....	—	—	—	—	—	—	—
Orange Free State.....	4	1	—	5	—	6	—
Transvaal.....	1	—	—	1	—	1	—
UNION.....	12	1	—	19	—	20	—

The active enforcement of legislation in regard to vaccination has been continued. Tables summarizing the position will be found in Annexure "E."

10. *Tuberculosis*.—The urgent necessity for a more active campaign against the spread of tuberculosis is becoming increasingly realised by the community. It is appropriate, therefore, at this stage to review the history of this disease in South Africa, and the administrative measures that have been adopted to combat it. The disease is to-day prevalent among all the races of the Union of South Africa. Whether it was present before the advent of Europeans is impossible to ascertain. The first recorded case in a European is that of Paulo da Gama—brother of Vasco da Gama—who was suffering from consumption when he commanded one of the ships which visited Southern Africa in 1498 ; he died on the voyage home to Portugal.

Tuberculosis may possibly have been present among the bantu races in the 15th century. The Bantu, however, carried out very strict public health laws ; for the good of the warring tribes, the survival of the fittest was absolutely essential, and invalids were not tolerated. The burning of huts and personal belongings of persons who died, and the isolation and cleansing of contacts, must have prevented the spread of infectious diseases.

After the European occupation of the Cape, tuberculosis became very prevalent among the Hottentots. During and after the eighties of last century, consumptives from Europe flocked to South Africa. There was, at that time, no sanatorium accommodation, nor any proper supervision of cases ; the patients lived in the little up-country towns or on farms, and precautions against spread of infection did not exist. This unsatisfactory state of affairs most probably accounts for the occurrence to-day of cases of tuberculosis in adults living on more or less isolated farms.

In January, 1895, registration of births and deaths came into force in the Cape Colony, and after this the subject of tuberculosis began to attract public attention. Before this registration, no particular notice appears to have been taken of tuberculosis, although occasional references were made to the increase of the disease among Natives in the reports of district surgeons. It was realised that many of the cases in Europeans were imported, but the danger to the people of South Africa was not then seriously considered, although reference was made to it in numerous reports by Dr. Gregory, the Medical Officer of Health for Cape Colony.

In addition to infection of white people, it was noticed that a very serious spread of the disease had taken place in the native districts—and also amongst the Hottentots and Mixed Coloured section of the population of the Cape Peninsula and South-western districts. Dr. Gregory recognised that alcoholism and the adoption of the changed conditions accompanying civilization contributed to the spread of the disease, but considered that the two main causes for the rapid increase among non-Europeans were :—

- (a) a constitutional incapacity to resist the invasion of the tubercle bacillus ;
- (b) *the unhealthy dwellings occupied by the Natives, especially in the towns, where they huddled together in dirty, insanitary, unventilated and ill-constructed habitations.*

He urged local bodies to exercise an enlightened and firm control over the dwellings occupied by the Native and Coloured population.

In November, 1906, a conference of the Principal Medical Officers of Health for the different British South African Colonies was held in Capetown ; the Cape Colony, Natal, Orange Free State, Transvaal, Southern Rhodesia, Basutoland, and the Bechuanaland Protectorate were represented. Among other health matters the tuberculosis problem was discussed, and several resolutions were passed, which the conference strongly recommended for consideration by the different Governments. These resolutions included a recommendation that notification of tuberculosis should be made obligatory on medical practitioners and others throughout all South African Colonies.

Suggestions were made for the better housing of Natives and Coloured persons, and a minimum cubic air-space of 300 cubic feet per inmate was recommended. The education of the public, including school-children, in regard to tuberculosis, its cause, and means of spread, was advocated.



The conference did *not* regard the provision of sanatorium accommodation as an urgent matter, but considered that provision should be made for suitable asylum accommodation for indigent consumptives.

The immigration of phthisical patients was discussed, but the conference was of opinion that no special measures "other than those which ordinarily applied to the immigration of indigent sick persons, could with justice or efficacy be employed in the case of phthisical patients." It was, however, suggested that all legitimate means should be taken in deterring the immigration of consumptives from overseas into South Africa.

Tuberculosis in cattle was discussed and it was stated that this disease in cattle had, until quite recently, been unknown in South Africa, but had been introduced in some places—notably in urban districts—and the disease was increasing considerably. A resolution was passed asking that all cattle imported into South Africa should be tested by means of Tuberculin, and reactors destroyed. Further, in areas where, in the opinion of the Agricultural Department, the disease was prevalent or increasing, the Government should obtain powers to test the cattle, especially milch cows, and frame regulations concerning the disposal of reactors.

After the South African war, there was a considerable fluctuation in the population, so that the Medical Officer of Health of the Cape Colony found it impossible to work out mortality rates. He, therefore, gave the number of deaths notified as due to tuberculosis in the sixty chief towns of Cape Colony, as follows :—

Year.	Deaths from All Causes.			Deaths from Tuberculosis.			Proportion of Deaths per 1,000 of all Deaths from Tuberculosis.		
	European.	Coloured.	All Races.	Euro-pean.	Col-oured.	All Races.	Euro-pean.	Col-oured.	All Races.
1904..	3,654	8,876	12,530	401	1,542	1,943	109·74	173·73	155·07
1905..	3,384	8,766	12,150	339	1,545	1,884	100·18	176·25	155·06
1906..	3,214	8,716	11,930	337	1,571	1,908	104·85	180·24	159·93
1907..	2,926	7,758	10,684	314	1,369	1,683	107·32	176·46	157·52

It was pointed out that although the total number of deaths from tuberculosis had diminished, the reduction had only been at the same rate as the reduction of deaths from all causes. As the deaths registered were not for the Colony generally, but for sixty towns, and as it was known that the populations of these towns had been diminishing since 1904, the above figures do not reflect a true diminution in the death-rate—in fact, the reports of district surgeons and medical officers of the Health Department were unanimous in their statements regarding the severe and increasing extent to which tuberculosis prevailed amongst the Native and Coloured population.

Much consideration had been given by the Boards of General Hospitals in the Colony, and especially in the Cape Peninsula, to the admission of tuberculosis patients into the general hospital wards. The Boards of the Peninsula Hospitals approached the Minister in November, 1907, and urged that such patients should not be admitted to the General hospitals, as they occupied beds which could be used much more advantageously for the treatment of patients with less prolonged illnesses—and further, that such tuberculous patients were a menace to the other patients. The Boards urged the Government to provide sanatorium accommodation for these tuberculous patients.

The Government intended providing accommodation in the proposed Alexandra Hospital for indigent consumptives, but owing to the lack of funds the scheme had not materialised. Twelve beds were set aside in the Old Somerset Hospital—three each for male and female Europeans, and male and female Coloured, indigent persons suffering from tuberculosis. All local authorities were notified that such accommodation was available, but little use was made of it—in fact, it was never necessary to refuse admission to any applicant. The Report of the Tuberculosis Commission published in 1914, described this accommodation as inadequate and unsuitable. A not inconsiderable number of paupers suffering from advanced phthisis were, however, admitted to the Old Somerset Hospital through other channels.

The Capetown Municipality voted funds for dealing with tuberculosis, and as a result, two buildings of a temporary nature for accommodating ten males and ten females were erected at the City Infectious Diseases Hospital on Green Point Common in 1907.

Act No. 16 of 1906 was passed to amend and extend the provisions of Act No. 27 of 1893, entitled the "Animals Diseases Act." In the amending Act provision was made for dealing with animals affected by tuberculosis. Section 2 (c) reads as follows :—

"In the case of tuberculosis :—

- (1) To cause the immediate destruction or permanent isolation under quarantine of the animals or animals found by the Board convened under section *nine* of said Act to be visibly infected, compensation being payable to the owner for animals so destroyed of an amount not exceeding one-fourth of the value of the animal before infection, such compensation to be assessed by the said Board and in no case to exceed £15 sterling for any one animal.



- (2) To cause all animals which have been in contact with infected animals, and are liable to be infected, to be tested with tuberculin by or under the supervision of a government veterinary surgeon or other officer thereto specially authorised in writing by the Minister, and to be isolated under quarantine."

Investigations had been carried out by Mr. William Robertson of the Colonial Veterinary Department. In his report Mr. Robertson estimated that over 60 per cent. of dairy cattle in the Cape Peninsula were affected with tuberculosis.

After Act No. 16 of 1906 had come into operation, testing with tuberculin was carried out in the Cape and adjoining Divisions; 19.6 per cent. of the animals tested were found to react and such cattle were slaughtered. The percentage for the Cape District was 54.9; for Stellenbosch 4.2; for Paarl 15.7; and for Malmesbury 10.7. In every case tubercular lesions were found on *post mortem* examination.

Examinations of milk were carried out in the Peninsula, and in four separate dairies the milk was found to contain tubercle bacilli—in one case to an enormous extent. It is clear, therefore, that even before 1908 tuberculosis in cattle had gained a considerable hold on the dairy cattle in the urban areas of the Cape Colony.

In his report for 1909, Dr. Gregory reviewed the history of Public Health in the Cape Colony, and devoted a section to tuberculosis. He drew attention to the laxness of notification, and stated that, in the absence of any reliable census figures of the population, mortality statistics could not be regarded as more than approximations. It was recognised that tuberculosis was spreading rapidly among the Coloured and Native races in South Africa, and the disease was considered of recent growth. As an instance of its ravages Dr. Gregory quotes the case of the Wittewater Mission Station in the Piquetberg district. Dr. Mitchell inspected this Mission Station and reported: "Phthisis had been prevalent in this Station during recent years and is increasing. Generally, one case in a family is followed by several others in the same family. There is no logical record of the number of deaths, but I am informed on good authority that the disease was unknown in the Station until 1895, when a girl who had been in domestic service in Capetown returned home suffering from consumption."

Dr. Gregory goes on to say: "That the checking of the spread of tuberculosis among the Native and Coloured population is a question of the gravest importance and of the greatest urgency there is no doubt whatever; indeed, it is, for the time being, perhaps the most vital of health problems in South Africa. But it is one of those problems which for its solution depends mainly on the people themselves, assisted by the local authorities responsible to the people for supervising and protecting the health and sanitation of local areas."

Discussing the provision of sanatorium accommodation, he very rightly stated that the sanatorium is only one of the means of combating tuberculosis. He doubted whether in a country like South Africa, such an institution would be a success as, for economic reasons, it would only be possible to treat only a very small fraction of the cases of tuberculosis in sanatoria; it was probable also that only a small proportion of tubercular cases would be prepared to submit to sanatorium treatment. In Capetown, where accommodation had been provided, there were usually only six or seven patients willing to take advantage of it, and the five chalets and ten beds were thus not fully utilised. He was opposed to proposals which at that time had been strongly urged—that a large sanatorium should be established in the Karroo. He strongly advocated that the local authorities should provide for free dispensary treatment for sufferers; and the erection of cheap open-air shelters for the housing of such cases as could not be accommodated in their own homes, the patient being free to follow his usual avocation and to provide for his own support or that of his family.

A circular letter was sent to the Mayor or Chairman of every local authority in the Cape Colony in June, 1909, drawing attention to the prevalence of tuberculosis in the Colony, and also reminding local authorities of their powers and obligations in dealing with the disease.

Tuberculosis was in March 1903, proclaimed to be an "Infectious Disease" under the Public Health Acts; thereby the duty was imposed upon the local authority for dealing under these Acts with this disease within its district. Little use was apparently made of the notifications.

The first Tuberculosis Commission for the Union was appointed on the 26th February, 1912:—

- "(a) to enquire into and take evidence for the purpose of ascertaining the extent and causes of the prevalence and spread of Tuberculosis in its various forms among Europeans, Coloured persons, Natives and Asiatics, in the different areas of the Union; having regard, *inter alia*, to the effect of race, immigration, occupation, housing, and the concentration of persons in compounds, mission stations and locations, and the conditions of life generally, on spreading the disease, and to report as to the steps which can be profitably taken by the Government, local authorities and others for ameliorating the condition of those affected with disease, and for controlling the disease in those areas in which it already prevails, and for preventing its introduction into fresh areas;
- (b) to enquire into and take evidence for the purpose of ascertaining the extent and causes of the mortality of Natives employed on the Witwatersrand Mines, and their susceptibility to pneumonia, with special reference to those coming from tropical areas, and to make recommendations thereon."



This Commission immediately encountered great difficulties because of the absence of statistics. Voluminous evidence was taken and numerous inspections carried out. Among its recommendations were measures for improving general conditions of housing and environment, the teaching of hygiene, school hygiene, and the teaching of hygiene in schools, and also medical inspection of school children and the provision of open-air schools.

The report drew attention to the difficulties in devising a scheme for the Union—the vast extent of the country, the different and divergent races to be dealt with, the ignorance of the Native population, the absence of organized bodies dealing with local affairs in many parts of the Union, and the divided and dual control exercised over matters relating to public health by the Union and Provincial Governments.

It was recommended that there should be as far as possible only one governmental Authority controlling or dealing with the disease, and that that Authority should be the Union Government. The scheme suggested for combating tuberculosis, included machinery for the discovery of cases, the care of the patient at his own home, and the prevention of spread, the diffusion of information concerning the disease and the improvement of general health conditions, short-period treatment and educative training of early cases at a sanatorium and the farm colony for the continuation treatment of suitable cases, institutions for the care and isolation of advanced cases and cases unlikely to recover. No action was, however, taken as a result of the Commission's Report.

The first definite prohibition of immigration of persons suffering from Tuberculosis in a clinically recognized form is contained in the Immigrants Regulation Act of 1913, although under this Act such persons may enter the Union subject to certain special conditions.

In 1919, Mr. John Garlick of Capetown made a donation of £25,000 as a contribution towards the building of a Sanatorium. The Cape local authorities contributed an equal sum, and the Government contributed £50,000. This was the first step by the Government towards combating tuberculosis in South Africa. While the Institution at Nelspoort was in course of erection, Dr. Peter Allan made a Tuberculosis Survey of the Union. An attempt was made to get some definite statistics, and all available figures were carefully analysed and local conditions studied. Valuable information resulted from this survey. From the figures supplied by the Census Department it was found that from 1912 to 1920 there had been a steady decrease in the number of European deaths from tuberculosis in the Union; the death-rate per 100,000 from tuberculosis having fallen from 50·49 to 46·00. These deaths were medically certified. In the various Provinces the rates were as follows:—

	<i>Cape.</i>	<i>Natal.</i>	<i>Transvaal.</i>	<i>O.F.S.</i>
1912.....	58·11	75·03	43·14	28·89
1920.....	45·94	40·54	47·70	32·08

The rise in the Orange Free State was explained by the fact that Tempe Military Hospital was used for accommodating tubercular ex-service men from 1917 to 1921.

Definite statistics were not obtainable for non-Europeans generally, and the only reliable ones for Coloured persons were those for Capetown. It was found that the curve of death-rates from tuberculosis in Coloured people followed the curve for Europeans, but the rates in Coloured people were, roughly, four times greater.

Since 1902, from which date statistics were available for Capetown, the rate for Europeans fell from 266 per 100,000 to 104 per 100,000 in 1922, and Coloured rates fell from 800 per 100,000 in 1902 to 371 in 1922.

It was impossible to get any accurate statistics regarding Natives, but it was found that the disease was widespread in the Native Territories.

From data available, it was found that the death-rate from tuberculosis in Indians in Natal was falling. The death-rate in 1904 was 325 per 100,000 and 211 in 1921.

*Tuberculosis Research Committee.*—In 1925 a Tuberculosis Research Committee was formed with a view to investigating Tuberculosis in Natives. Finances were provided by the Government, the Chamber of Mines, and the Natives' Deferred Pay Fund. Very complete and extensive investigations were made, and the Report of the Committee was published by the South African Institute for Medical Research in March, 1932.

Tuberculosis was studied from a pathological aspect on the Rand, and extensive investigations and testing with tuberculin were carried out in the Native areas. The disease was found to be widespread in the Native Territories. The tuberculin tests showed that the Natives were to a very large extent "tuberculized"—the percentage of positive reactors being 66 for Natives of all ages and both sexes.

A considerable amount of clinical work was done, but only a few *post-mortem* examinations were obtained.

The fate of "boys" suffering from tuberculosis, repatriated from the mines, was investigated, and it was found that at the end of two years—60 per cent. were dead, 4 per cent. were alive and fit to return to heavy work, 26 per cent. were fit for light work, and 10 per cent. were unfit for any work.

Among the Natives living under their own conditions, the incubation period of tuberculosis was apparently at least two years, so that it was impossible to determine how far repatriated tuberculous were responsible for the spread of the disease; as far as could be ascertained, not more than 25 per cent. of the cases in Natives in the Transkei could trace any connection with the mines. In many instances the disease ran a fairly chronic course. Tuberculosis of bones, more especially spinal disease, is common in the Transkeian Territories.



Tuberculin tests were carried out on over 90,000 boys coming to work on the Rand gold mines, and their subsequent history followed up. The results are summarised as follows :—

Total number of boys tested.....	93,979
Total number of " positive reactions ".....	61,115
Total number of " negative reactions ".....	32,864
" Positives ".....	65 per cent.
" Negatives ".....	35 per cent.
Total number of cases of tuberculosis, all forms, arising in this group	566
The boys yielding a positive reaction.....	453 or 738 per 100,000.
The boys yielding a negative reaction.....	114 or 347 per 100,000.
3,879 boys gave a strongly positive reaction (P.P.), and 60 cases of tuberculosis arose in this group, equal to 1,547 per 100,000.	
In 57,236 boys the reaction was positive (P.), and 391 cases of tuberculosis arose in this group, equal to 683 per 100,000.	

The more strongly positive the reaction, the more likely the native was to develop tuberculosis.

This was an entirely different result from what had previously been regarded as usually occurring, namely, that actual cases of tuberculosis were in inverse ratio to the percentage of reactors to tuberculin in a community.

The majority of cases of tuberculosis in mine natives is most probably due to a lighting-up of previous infection, although many cases take on an acute or unmodified course. In 600 *post mortems* on mine natives it was found that 338 were of acute type, 200 were of chronic type, 62 had tuberculous lesions, but in this latter group of 62, tuberculosis was not the cause of death.

Changed conditions of life have therefore a marked effect on the course of tuberculosis. The tuberculin reaction indicates infection, and is of the nature of an allergic reaction, but allergy and immunity do not by any means go hand in hand. Confirmatory evidence of this has recently been given in America where tuberculin tests were carried out on nurses entering training in the University of California Hospital. Between 6 and 7 per cent. of the student nurses developed clinical tuberculosis, and a further 4 per cent. after graduation. Most of the nurses who developed clinical tuberculosis during training were positive reactors on entrance into training. The majority of nurses who failed to react to tuberculin on entrance also failed to react when re-checked.

A further point regarding tuberculosis in the negro is the tendency of the disease in that race to run a more acute course than in the white race. Recent investigations into the subject have been carried out in America, and although many of the negroes have been living under conditions often better than those of some white people, and although they have been in contact with civilization for over 200 years, yet their resistance to tuberculosis is distinctly less than that of white people.

South African Natives do show satisfactory improvement under Sanatorium treatment, as judged by the results at Nelspoort Sanatorium and also by the results of treating tuberculous convicts at a special gaol in Cradock.

Dr. Harvey Pirie typed out the tubercle bacillus found in 100 cases of tuberculosis in natives, and in every instance the casual organism was of the *human* strain. Cultures were made and animal experiments were carried out.

*Bovine Tuberculosis.*—Reference has already been made to the existence of bovine tuberculosis in the Cape Province, where in 1906 19·6 per cent. of the cattle tested were reactors. Dr. Gilles de Kock, Deputy Director of Veterinary Services, Onderstepoort, published the results of investigations carried out in Durban areas in 1931. It was found that of a total of 2,402 cattle in dairy herds, 933 gave a positive reaction to tuberculin, i.e., 38·3 per cent. Among loose cattle in the farm area, 25·5 per cent. gave a positive reaction. This is a most serious state of affairs, and calls for immediate action. In Denmark, by following the method of Bang whereby calves from tuberculous cattle are immediately isolated, excellent results have been obtained in reducing the amount of bovine tuberculosis. Tuberculin testing of cattle should be carried out, and Bang's method used. The longer remedial methods are delayed, the more difficult will be the eradication.

It has been stated by competent veterinary authorities that bovine tuberculosis has only increased to its present proportions within the last 30 years. Mr. C. E. Gray, at one time Chief Veterinary Surgeon of the Union, stated that until 1905 bovine tuberculosis was not considered to be at all prevalent. Tuberculin tests on dairy cattle carried out in 1906, however, revealed a widespread infection. For many years the Western Province of the Cape had supplied colonial-bred breeding stock to the rest of South Africa, so that the disease was conveyed to other areas of the sub-continent. At one time cattle were imported from Madagascar; one consignment of such cattle, 64 in number, landed in Durban in 1906, was tested, and 42 reacted to tuberculin, many of them being severely affected with tuberculosis. At Port Elizabeth 65 per cent. of imported Madagascar cattle were found to be tuberculous.

Tuberculosis of the bovine type has been found in Kudu and Cape Duiker living under natural conditions in the Albany district of the Cape.



*Measures Specifically Directed against Tuberculosis.—Notification.*—Tuberculosis was proclaimed a notifiable disease in the Cape Colony in 1903. Under the Public Health Act, No. 36 of 1919, Section 18 (i), all forms of tuberculosis which are clinically recognizable, are notifiable in the Union.

In 1904, a National Association for the Prevention and Eradication of Tuberculosis was formed in Capetown.

In 1907, twenty beds were set aside for tubercular patients at the City Infectious Diseases Hospital, Capetown, and also some beds at the Old Somerset Hospital.

The Free Dispensary in Capetown started a special section for treating tuberculosis in 1909, the undertaking being subsidized by the Cape Government and the Capetown Municipal Council.

A Tuberculosis Bureau was started in Durban in 1911, but has long since ceased to function.

*Johannesburg.*—After the war, the Joint Council of the South African Red Cross Society and St. John Ambulance Society had some £50,000 surplus funds. Lord Buxton, the then Governor-General, suggested that this money should be devoted to the prevention and eradication of tuberculosis in South Africa. Unfortunately, it was decided at a meeting held in Johannesburg that £10,000 should be used for establishing a Tuberculosis Dispensary there. Such a dispensary was opened in Bok Street, Johannesburg, in 1923, but ceased to function as such after a short period, and the building is now used as a dental clinic. The remaining £40,000, contrary to a fairly prevalent belief, has never been made available for anti-tuberculosis work but has been used to further the work of the South African Red Cross Society and of the St. John Ambulance Association.

In May, 1924, the Nelspoort Sanatorium was opened for patients. In all 92 beds were provided, 36 for Coloured and Natives, and 56 for Europeans. In 1927 a further 16 beds for Europeans were added.

Full advantage was not taken of the available accommodation, and for the first two years the daily average number of patients was only 67; during the past four years, however, the daily average number of patients has increased to 90. The ward for Coloured patients is often not full, while there have often been Europeans to the number of 30 awaiting admission. The result is that at present many Europeans have to wait three or four months for admission after their applications have been submitted.

There are three classes of patients:—

- (1) *Free Patients.*—Half the cost of treatment is paid by the local authority, and half by the Department of Public Health.
- (2) *Part-paying Patients.*—In this case the patient pays a contribution towards the cost of his treatment, the balance being paid in equal shares by the local authority and the Department of Public Health.

In these two classes of patient, application for admission must be submitted by the local authority, which guarantees payment of the agreed amount in each case. The tariff per patient per day is fixed periodically by the Advisory Committee—representing the Cape local authorities, the Trustees of the late Mr. Garlick, and the Government. The present rate is 10s. 6d. per day for Europeans and 8s. 6d. for non-Europeans.

- (3) *Full-paying Patients.*—The institution was not intended for full-paying patients, but as in the early years the other classes of patients did not take up all the beds, and as applications were received from people willing to pay the full rates, such patients were admitted at a tariff of 12s. 6d. a day.

In 1932, 290 patients were admitted to Nelspoort Sanatorium. Unfortunately, in the absence of a clearing-house, unsuitable cases are often recommended and admitted. The following table summarises the position during the past year:—

TABLE M (i).—TUBERCULOSIS: NOTIFICATIONS DURING THE YEAR ENDED 30TH JUNE, 1933.

	European.	Non-European.	Total.
Cape (excluding Transkei).....	481	3,244	3,725
Transkei.....	—	810	810
Transvaal.....	98	1,294	1,392
Natal.....	102	674	776
Orange Free State.....	29	179	208
UNION.....	710	6,201	6,911



The patients admitted during the year were in the following stages of the disease :—

Race.	Stage I.	Stage II.	Stage III.
European.....	13.1 per cent.	58.3 per cent.	28.6 per cent.
Non-European.....	19.6 per cent.	51.0 per cent.	29.4 per cent.

Of the 277 admissions during the year, 260 were free, half their cost being paid by the local authority and half from the Department's vote, 9 were part-paying or contributing, and 8 were full-paying patients.

The average stay of patients in the institution was: Europeans, 113 days; non-Europeans, 96 days.

Of the 268 patients discharged, 126 were noted as "much improved," 108 as "improved," 33 as "stationary," and 1 as "worse."

The majority of the non-European cases are sent from Capetown. There is no doubt that many of the smaller local authorities do not make any attempt at treating, or arranging for treatment of, tubercular cases—more especially Coloured people—in their areas.

*The Capetown Municipality* has a scheme of anti-tuberculosis work which includes clinics, a hospital for observation cases and for advanced cases, sanatorium accommodation at Nelspoort, an energetic aftercare committee, and the nucleus of a farm colony. The scope of this work has increased very considerably in the past five years; more beds for tuberculosis patients have recently been added to the City Infectious Diseases Hospital, and the campaign against tuberculosis in Capetown is being energetically carried on.

*The Divisional Council of the Cape* also has a somewhat less comprehensive scheme.

In *Port Elizabeth* a voluntary organization known as "The Ministering League" for many years did very valuable work in connection with tuberculosis.

There is now a clinic in Port Elizabeth, and tubercular patients are also accommodated in the City Infectious Diseases Hospital. During the year ended 30th June, 1932, 292 patients attended the Tuberculosis Clinic—the total attendances being 1,793; while home visits by health visitors amounted to 919. Forty patients suffering from tuberculosis were treated in the Infectious Diseases Hospital, while 21 were sent to Nelspoort Sanatorium.

Among the smaller municipalities, *Stellenbosch* and *Oudtshoorn* have made practical efforts to tackle the problem.

In the Orange Free State, *Blacemfontein* has an infectious diseases hospital at Tempe, where consumptives are treated.

In *Johannesburg*, *Durban* and *Pietermaritzburg* consumptives are treated in the General Hospitals.

Springkell Sanatorium—managed by the Chamber of Mines specially for cases of miners' phthisis—admits a few male European consumptives from local authorities.

Very little has been attempted in areas other than the municipalities mentioned. That local authorities can do a very considerable amount of good work is very amply demonstrated in Capetown and Port Elizabeth. In several other areas there has been a considerable amount of discussion about what should be done, but little or no real attempt has been made to deal with the position.

The Department of Public Health is alive to the seriousness of the position and is prepared to help local authorities in every possible way, but little can be done without the active co-operation of local authorities and without more ample funds being voted by Parliament.

*Tuberculosis in Natives.*—Two institutions are doing exceedingly valuable work among the natives. Lovedale, in the Ciskei, has for many years cared for tuberculous natives—both medical and surgical cases—while the hospital at the Holy Cross Mission in Pondoland has, since 1921, also rendered invaluable help.

*Present Position of Mortality from Tuberculosis in Europeans.*—The following table gives the death-rate from tuberculosis per 100,000 of the European population in the various Provinces, and in the Union as a whole, from 1912 to 1931 :—



TABLE M (ii).—DEATH RATES FROM TUBERCULOSIS PER 100,000 OF POPULATION—EUROPEANS ONLY.

Year.	CAPE.			NATAL.			TRANSVAAL.			ORANGE FREE STATE.			UNION.		
	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.
1912.....	70.55	44.83	58.11	85.84	62.66	75.03	55.97	26.97	43.14	29.58	28.09	28.89	61.10	38.32	50.49
1913.....	70.19	53.93	62.31	81.15	52.19	67.60	57.61	22.43	41.88	29.54	24.13	27.02	61.21	39.67	51.13
1914.....	60.82	40.27	50.85	83.59	32.85	59.80	57.60	25.42	43.08	28.44	14.31	21.81	57.26	31.39	45.10
1915.....	56.42	40.43	48.64	69.37	33.52	52.52	60.69	21.73	42.95	19.98	25.92	22.78	54.26	31.76	43.63
1916.....	42.31	44.91	43.58	75.22	35.95	56.72	72.37	33.91	54.71	27.30	16.30	21.99	53.91	36.77	45.78
1917.....	64.12	51.27	57.53	66.75	38.21	53.28	70.23	22.42	48.09	37.75	16.12	27.44	63.18	35.55	50.02
1918.....	52.07	39.25	45.81	64.87	46.97	56.39	76.62	21.28	50.80	37.65	18.20	28.33	60.24	31.06	46.28
1919.....	41.56	49.23	45.32	57.63	30.66	44.73	82.21	13.39	49.82	43.60	12.37	28.61	57.95	30.55	44.77
1920.....	52.55	39.07	45.94	73.70	43.50	59.14	72.91	19.73	47.70	45.30	17.79	32.08	60.92	30.07	46.00
1921.....	36.99	64.06	60.48	74.93	24.00	50.21	102.08	22.70	64.22	54.13	23.12	39.20	74.65	40.87	58.26
1922.....	61.70	55.91	58.84	35.64	11.54	23.90	75.78	22.41	50.24	20.07	19.52	19.81	59.27	35.56	47.74
1923.....	55.03	52.43	53.74	41.62	40.45	41.05	74.45	21.12	48.77	19.91	17.17	18.59	56.53	35.91	46.46
1924.....	67.04	52.82	60.00	50.93	36.38	43.77	84.54	23.41	55.01	14.71	22.25	18.33	65.47	37.08	51.59
1925.....	65.65	62.14	63.91	73.89	40.51	57.42	74.27	21.84	48.87	30.01	12.59	21.65	65.19	39.68	52.70
1926.....	58.97	57.36	58.18	49.23	39.85	44.64	95.54	24.41	61.09	24.89	16.22	20.68	67.29	38.90	53.41
1927.....	61.36	59.87	60.62	71.95	28.73	50.78	78.78	17.87	49.20	24.58	12.98	18.94	64.30	36.10	50.50
1928.....	60.72	56.51	58.64	54.99	25.55	40.56	85.08	20.74	53.75	31.76	15.74	23.96	65.61	35.69	50.95
1929.....	57.98	51.63	54.85	44.58	22.56	33.78	72.48	18.08	45.95	22.16	17.47	19.87	57.70	32.54	45.37
1930.....	62.20	50.58	56.46	51.74	31.51	41.81	73.84	18.96	47.09	23.47	6.87	15.36	61.05	31.96	46.78
1931.....	55.79	55.75	55.77	54.26	26.34	40.54	64.26	15.05	40.33	24.81	11.92	18.49	55.41	32.62	44.22

Prior to 1921 certified deaths only were included.

M. = Males ; F. = Females ; P. = Persons.



Until 1920 only medically certified deaths were included in the statistics, but since 1921 all deaths from tuberculosis, including those not medically certified, have been used in formulating the rates. From 1921 to 1931 there has been a fall in the death-rate in all the Provinces. In 1931, in 90·44 per cent. of all deaths of Europeans in the Union, the cause of death was medically certified, whereas in 1921 only 79 per cent. were so certified.

The deaths from tuberculosis in England and Wales in 1930 and 1931 amounted to 89·8 and 89·6 per 100,000 of the population, as against 46·78 and 44·22 per 100,000 of the white population in the Union of South Africa.

Table M (iii) shows the distribution of cases of tuberculosis notified during the year. The present total of 6,911 is an increase on that of last year (6,449) and the year before that (6,148). The increased figure has, however, little significance except that possibly non-European sufferers are seeking medical aid in rather larger numbers. There can be no doubt that the notifications among non-Europeans still greatly under-estimate the prevalence of the disease.

TABLE M (iii).—ADMISSIONS, DISCHARGES AND DEATHS DURING THE YEAR ENDED 30TH JUNE, 1933.

	Total.	European.			Non-European.		
		Male.	Female.	Total.	Male.	Female.	Total.
In Sanatorium on 1st July, 1932	91	30	29	59	18	14	32
Admitted during year.....	277	90	85	175	53	49	102
TOTAL.....	368	120	114	234	71	63	134
Died during year.....	5	1	3	4	1	—	1
Discharged during year.....	268	91	78	169	52	47	99
TOTAL.....	273	92	81	173	53	47	100
In Sanatorium on 30th June, 1933	95	28	33	61	18	16	34

*Accommodation Required for Cases of Tuberculosis.*—Under the provisions of the National Insurance Act of 1911 in Britain, insured persons are entitled to “sanatorium benefit” which means treatment in institutions (other than Poor Law) or otherwise; this includes dispensaries. Finances are provided by setting aside 9d. per insured person for this benefit, and the insurance committees of any county or county borough may extend such benefit to dependents of insured persons. It is estimated that one dispensary is necessary per 150,000 or 200,000 persons, and that one sanatorium bed is required per 5,000 persons—and the same number for observation, training and isolation.

On this basis, accommodation for Europeans in South Africa would include 300 sanatorium beds and 300 beds for isolation.

The death-rate from tuberculosis among Europeans in South Africa, is, however, half that in England and Wales, so that on a similar basis a total of 150 beds would be required for sanatorium treatment.

At present there are 72 beds for sanatorium treatment at Nelspoort, and a variable number is available for males in the miners' phthisis sanatorium at Springkell. There are 54 hospital and observation beds specially set aside in Capetown at the City Infectious Diseases Hospital and 5 such beds in the City Infectious Diseases Hospital at Port Elizabeth, while in Pretoria and Bloemfontein cases of tuberculosis are admitted to the Infectious Diseases Hospitals. In Pretoria, very considerable inconvenience is being experienced because of consumptives occupying beds which are really designed for cases of other infectious diseases. In other places such as Johannesburg and Durban cases are admitted to the General Hospitals, often at great inconvenience to the hospital authorities.

Experience at Nelspoort has shown that there is an increasing demand for sanatorium treatment and there is usually a waiting list of about 30 Europeans. It is proposed to add 32 beds for Europeans in the near future which would meet the present need, and a further number to bring the total up to 150 would probably be necessary later.

At present, many unsuitable cases are sent to Nelspoort Sanatorium. Objection has sometimes been raised against the distance of the Sanatorium from some parts of the Union. If suitable cases are sent, the distance is not an objection, but it certainly is for advanced cases. For financial reasons it is better to have one central institution, rather than several small sanatoria.

Accommodation for advanced cases could best be provided by building suitable wards in connection with existing hospitals. Capetown has already 54 beds for observation and advanced cases, and this is found to be insufficient.

Accommodation is necessary for cases in other areas of the Cape Province such as at Port Elizabeth, East London, and Kimberley—say, a total for the Province of 100.



It should be pointed out that in England and Wales, the Poor Law Hospitals admit indigents suffering from tuberculosis—in fact, Sir Arthur Newsholme (formerly Principal Medical Officer to the English Health Department) stated that he considered that the isolation of such cases in the Poor Law Hospitals had played a considerable part in the reduction of the death-rate from tuberculosis in England and Wales. Such institutions do not exist in the Union of South Africa, hence a proportionately greater number of beds for advanced cases will be necessary than under the British National Insurance Scheme.

In the Transvaal such accommodation could be most easily provided at the Rietfontein Infectious Diseases Hospital where 50 beds for Europeans would be required. A further 6 beds in connection with the Infectious Diseases Hospital at Pretoria would be necessary for observation of cases, such cases being sent as soon as possible either to the sanatorium or the hospital at Rietfontein.

In Natal, a hospital of 75 beds for Europeans would be necessary; this should be situated outside the coastal belt, but as near the larger centres as possible.

Cases in the Orange Free State might be accommodated at the Infectious Diseases Hospital at Bloemfontein. Judging by the mortality returns, not more than 20 beds would be required.

In the larger centres there should be no difficulty in arranging for dispensary treatment. The dispensary is a centre for diagnosis, treatment, and “after-care.” Such dispensaries are now in existence in Capetown and Port Elizabeth, and are doing excellent work. In the less densely populated areas the establishment of dispensaries is more difficult, but it should be possible to attach observation beds to existing hospitals, where the patients could remain for a short period.

*Treatment of Non-Europeans.*—It is most difficult to give definite requirements for the treatment of non-Europeans, owing to the absence of any reliable statistics.

The death-rate in Capetown is, roughly, four times greater in non-Europeans than among Europeans; in 1931 there were 598 deaths from tuberculosis in non-Europeans as compared with 98 in Europeans.

There are at present 98 beds for treatment of non-European consumptives at the City Infectious Diseases Hospital, Capetown. There are 36 beds for sanatorium treatment of non-Europeans at Nelspoort.

In contrast to the European side of the sanatorium, there is not any waiting list of non-Europeans, not because there is less tuberculosis among these Coloured people, but because of the difficulty of local authorities finding the necessary money to send such cases for sanatorium treatment.

In Port Elizabeth there are 5 beds available for non-European consumptives. The Addington Hospital at Durban has 35 beds for non-Europeans, and the Indian Immigration Hospital has 22 beds for Native and Indian tuberculous cases. A few non-European tubercular cases are accommodated at the Pretoria Infectious Diseases Hospital.

No provision exists for isolating tubercular cases in the Transkei and Ciskei, except that provided in the mission hospitals. A few cases are sent to Nelspoort by the Transkeian General Council.

These patients submit quite readily to treatment and show considerable improvement, but in the absence of any follow-up work much of the good is lost. The best plan would be to encourage the activities of the mission hospitals, rather than to attempt to provide any new scheme. Beds could be provided at some of the existing general hospitals at Umtata, Kokstad, and Queenstown.

In the Transvaal, beds for non-Europeans could be suitably provided at Rietfontein, and similarly near Durban.

Apart from measures specifically directed against tuberculosis, attention must be given to preventive measures, such as suitable housing schemes. An insanitary dwelling is still a danger even in a land of sunshine, and in many instances housing in South Africa, especially for non-Europeans, is very gravely at fault.

11. *Typhus Fever.*—As has often been pointed out, typhus fever is very closely associated with economic stress. Great poverty is almost invariably accompanied by lice, which transmit the infection, and malnourishment, which greatly reduces resistance to the disease. It is not surprising, therefore, that the economic depression caused a considerable increase in the number of cases of this disease. As will be seen from the attached table, the number notified was 2,125; last year it was 1,550, and the year before that 1,541.

TABLE N.—TYPHUS FEVER: CASES AND DEATHS REPORTED DURING THE YEAR ENDED 30TH JUNE, 1933.

Province.	Number of Districts in which Outbreaks Occurred.	European.		Non-European.		Total.	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cape.....	50	43	3	1,606	232	1,649	235
Natal.....	9	9	—	199	31	208	31
Orange Free State.....	14	1	—	242	35	243	35
Transvaal.....	4	1	—	24	1	25	1
UNION.....	77	54	3	2,071	299	2,125	302



Most of the cases, 1,647 in all, occurred in the Eastern Cape Province, where outbreaks were dealt with in fifty different districts. The most thickly populated and poorest districts again fared worst—Glen Grey leading easily with 339 cases and 55 deaths. Stress in the Free State is reflected in the 243 cases reported from that Province. From Natal 208, and from the Transvaal 25, cases were reported. The victims, as shown in the table, were very largely natives; but the 54 European cases demonstrate the danger of allowing reservoirs of infection to persist in native areas.

All the outbreaks were dealt with as they were reported, by the routine preventive measures of deverminisation of the bodies and clothing of patients and known contacts; in this way, spread of infection was to some extent arrested. But it must, again, be emphasised that the problem is primarily an economic one. Until the economic status of the inhabitants of these impoverished districts can be lifted to the extent of producing clean and healthy bodies, local deverminisation will have little permanent value: the disease will continue to take its annual heavy toll, and the health of neighbouring European communities will be threatened.

12. *Venereal Diseases*.—The following table summarizes the work done during the year in connection with venereal diseases by district surgeons, local authorities, and institutions:—



TABLE O.—VENEREAL DISEASES: CASES TREATED AND ATTENDANCES, YEAR ENDED 30TH JUNE, 1933.

Locality.	In Hospital.						Outdoor.					
	Syphilis.		Gonorrhoea and Other Venereal Diseases.		Total.		Syphilis.		Gonorrhoea and Other Venereal Diseases.		Total.	
	European.	Non-European.	European.	Non-European.	European.	Non-European.	European.	Non-European.	European.	Non-European.	European.	Non-European.
(1) By District Surgeons.												
Cape.....	23	788	19	182	42	970	328	9,476	244	607	572	10,083
Natal.....	38	321	20	68	58	389	144	2,345	61	326	205	2,671
Transvaal.....	5	194	—	24	5	218	350	7,548	191	518	541	8,066
Orange Free State.....	—	8	2	1	2	9	286	6,399	184	1,336	470	7,735
TOTAL.....	66	1,311	41	275	107	1,586	1,108	25,768	680	2,787	1,788*	28,555*
(2) At Institutions and Clinics.												
Aliwal North.....	—	2	—	2	—	4	4	231	—	1	4	232
Barberton.....	—	219	—	—	—	219	—	—	—	—	—	—
Bethlehem.....	—	26	—	15	—	41	—	—	—	—	—	—
Bloemfontein.....	3	177	15	50	18	227	189	961	337	52	526	1,013
Bochem.....	—	470	—	8	—	478	—	591	—	10	—	601
Boksburg.....	1	7	5	5	6	12	2	100	—	5	2	105
Capetown.....	51	183	79	40	130	223	8,181	13,890	6,563	2,899	14,744	16,789
Craddock.....	—	97	—	—	—	97	—	—	—	—	—	—
Durban.....	12	793	49	136	61	929	512	1,636	5,820	2,209	6,332	3,845
East London.....	—	—	—	—	—	—	419	1,191	356	232	775	1,423
Elim.....	4	492	2	12	6	504	2	67	—	—	2	67
Johannesburg.....	—	—	—	—	—	—	5,951	—	4,457	—	10,408	—
Kimberley.....	6	126	—	57	6	183	43	2,004	36	217	79	2,221
Kingwilliamstown.....	—	123	—	—	—	123	2	21	—	1	22	22
Kroonstad.....	—	—	—	—	—	—	—	1,700	—	4	—	1,704
Krugersdorp.....	1	9	—	—	1	9	19	40	21	9	40	49
Kuruman.....	—	37	—	—	—	37	—	270	—	—	—	270
Marianhill.....	—	—	—	—	—	—	—	90	—	—	—	90
Mphahlele, Pietersburg District.....	—	—	—	—	—	—	—	1,356	—	114	—	1,470
Olifantshoek.....	—	—	—	—	—	—	18	152	4	—	22	152
Oudtshoorn.....	—	—	—	—	—	—	20	238	—	—	20	238
Pretoria.....	—	—	—	—	—	—	697	8,518	1,606	1,805	2,303	10,323
Port Elizabeth.....	1	16	5	2	6	18	1,353	4,413	1,965	755	3,318	5,168
Potchefstroom.....	—	—	—	—	—	—	—	4,058	—	—	—	4,058
Port St. Johns.....	—	—	—	—	—	—	—	93	1	79	1	172
Pietermaritzburg.....	—	53	—	—	—	53	181	1,918	2	3	183	1,921
Rietfontein.....	75	2,677	213	790	288	3,467	696	2,032	—	—	696	2,032
Sekukuniland.....	—	9	—	—	—	9	1	827	—	—	1	827
(Jane Furse Memorial)												
Springs.....	—	—	—	—	—	—	67	1,470	—	1	67	1,471
Standerton.....	—	3	—	—	—	3	—	2	—	1	—	3
Stellenbosch.....	1	17	—	—	1	17	—	1,361	—	—	—	1,361
Swellendam.....	—	16	—	—	—	16	—	—	—	—	—	—
Uitenhage.....	—	39	—	1	—	40	—	—	—	—	—	—
Victoria West.....	—	—	—	—	—	—	190	2,346	72	18	262	2,364
Vryburg.....	—	107	—	1	—	108	—	69	—	—	—	69
TOTAL.....	155	5,698	368	1,119	523	6,817	18,547	50,723	21,240	8,300	39,787+	59,023+

\* Patients only



There still appears no sign of any diminution in the prevalence of venereal diseases in the Union. The Department has continued to encourage local authorities to institute and maintain clinics for treatment and prevention. The necessary drugs are supplied free of charge to such clinics and also to district surgeons. Further, two-thirds of the approved net cost of recognised clinics is refunded by the Department. While many local authorities have availed themselves of these facilities, there are still many who have as yet taken no steps to combat this social evil.

## VI. GENERAL.

1. *Housing*.—Full details of the working of the Housing Act, No. 35 of 1920, from the date of its commencement, are given in the report of the Central Housing Board for the calendar year 1932 which was laid in typescript on the Tables of Parliament. A summary of the position as at 30th June, 1933, is given in the following table:—



TABLE P.—HOUSING ACT No. 35 OF 1920 : WORKING FROM PROMULGATION (16TH AUGUST, 1920) TO 30TH JUNE, 1933.

Province.	Loan Application Approved.			Loan Issues.	Number of Houses					
	European.	Non-European.	Total.		Completed.	Under construction.	Approved, but not yet commenced.	Total.	Total for European occupation.	Total for non-European occupation.
(A) <i>Economic Housing.</i>	£	£	£	£						
Cape.....	1,227,255	632,345	1,859,600	1,784,853	6,319	74	192	6,585	1,994 (a)	4,591 (b)
Natal.....	541,565	89,053	630,618	615,641	869	102	17	988	522	466 (c)
Orange Free State.....	494,009	14,039	508,048	500,112	1,288	123	11	1,422	589	833 (d)
Transvaal.....	872,341	228,220	1,100,561	1,081,980	3,210	24	78	3,312	1,116	2,196 (e)
TOTAL.....	3,135,170	963,657	4,098,827	3,982,586 (f)	11,686	323	298	12,307	4,221	8,086
(B) <i>Sub-Economic Housing.</i>										
Cape.....	75,350	230,878	306,228	154,693	598	—	348	946	320	626
Transvaal.....	9,400	—	9,400	9,400	25	—	—	25	25	—
TOTAL.....	84,750	230,878	315,628	164,093	623	—	348	971	345	626
TOTAL (A) AND (B)...	3,219,920	1,194,535	4,414,455	4,146,679	12,309	323	646	13,278	4,566	8,712

(a) Includes a hostel to accommodate 86 persons.

(b) Includes 1,337 single rooms in blocks, 8 barracks and 160 flats.

(c) Includes 3 barracks and 36 single rooms in blocks.

(d) Includes 24 single rooms in blocks, the balance of 809 representing the approximate number of dwellings to be built out of a total loan of £13,239 made to three Local Authorities for use exclusively in purchasing materials to be advanced to Coloured persons and Natives building their own homes.

(e) Includes 303 single rooms in blocks, 3 compounds and 13 hostels.

(f) Includes £821,617 re-issued out of repaid capital.



No new large schemes of either economic or sub-economic housing were initiated during the year and the financial depression was responsible for local authorities continuing to proceed slowly with their building programmes under the Act, except, latterly, at certain Rand centres where, owing to mining development and the consequent growth of the population, the housing shortage had become acute, necessitating the making of further substantial allocations of loan funds for economic housing, *inter alia*, to the Municipalities of Springs, Brakpan, Nigel and Randfontein for assisting deserving persons of limited means to secure their own homes. The average wage received by a miner is understood to be about £30 a month and the policy of the Government has always been to regard this wage as fairly entitling the recipient to benefit under the Housing Act.

The completion of the final report on a housing survey of Wards 2 to 7 of the Capetown Municipality, carried out by the Medical Officer of Health, prompted the Department to address an enquiry to the Council as to the steps it contemplated for dealing with the slum menace and conditions of gross overcrowding revealed in that report. In a reply, dated 9th May, 1933, the Town Clerk stated that the matter was engaging the serious consideration of the Council's responsible committees and under cover of a later communication furnished a copy of a report by the Joint Health and Housing Committees, as submitted to and adopted by the Council, setting forth the future housing policy of the Council which included the decision to embark on a programme of tenement housing to be carried out over a period of eight years at an expenditure of £100,000 a year. Some of this housing will be on economic and some on sub-economic lines, the Council having promised to communicate the exact requirements of each class on completion of certain enquiries that were being instituted. Meanwhile work is proceeding on two tenement schemes of the Council approved last year, as also on a second section of the Council's sub-economic scheme at Bokmakirie embracing the erection of a further 150 cottages for occupation by coloured persons at an estimated cost of £43,890. The Capetown Citizens' Housing League Utility Company also continued its useful work not only of stimulating public opinion in the matter of housing reform, but in bringing to completion its successful scheme at Koeberg Road, Maitland, providing for a total of 304 dwellings for accommodating European families of the poorer class. Mention is also to be made of what the Pinelands Garden City Local Board has done towards ameliorating conditions of bad and insufficient housing in the Cape Peninsula through the erection out of loan funds granted since the commencement of the Act of a total of 283 dwellings for occupation by Europeans.

At the other large urban centres of the Union very little building activity under the Act was displayed during the year. The Oranje Vroue Vereniging received through the Bloemfontein Municipality a loan of £4,633 for financing the erection of a hostel to accommodate European girl employees in receipt of small wages, the structure having recently been completed. At Durban the Council's Native Village scheme at Umlazi (for which a loan of £26,200 was authorised and comprising the erection of 101 dwellings) is proceeding apace, as is also work on the 18 cottages under the Council's scheme at Erskine Terrae, in the Dock area for which a loan of £20,355 was sanctioned.

It is a matter of disappointment not to be able to record the accomplishment of anything tangible towards improving the housing conditions of Indians in and around Durban for which a sum of £50,000 has been earmarked for the past four years out of loan funds under the Housing Act. No effort was spared to bring the sale of plots under the Council's scheme at Cato Manor to the notice of the Indian community and circulars and dodgers in all the various Indian dialects were freely distributed amongst the Indians. The aid of the Natal Indian Congress was enlisted to push the sales, but unfortunately there would appear to be an element of boycott in respect of this endeavour on the part of the Council.

Section 3 (2) of the Housing Act lays down that loan funds thereunder shall bear interest at such rate as the Treasury may from time to time prescribe and it has been the policy of the Government to issue loans for economic housing at rates of interest approximating the cost of raising the money. The interest rate on loans made since the 1st September, 1922, has been at 5 per cent. per annum, but owing to money conditions having become very much easier, it has been decided that the rate of interest payable to the Treasury shall be 4 per cent. per annum on issues made to an Administrator from the 1st September, 1933, for economic housing, and on all sums advanced by an Administrator to a local authority from that date for economic housing from moneys received in repayment of advances to local authorities. There will be no alteration in respect of loans for sub-economic housing which will continue to bear interest at the rate of 3 per cent. per annum and be subject to the same conditions as hitherto.

For the year 1932-33 the loan provision was £100,000 each for economic and sub-economic housing and the drawings during that year for the two classes of housing totalled £51,085 and £60,978 respectively. The explanation of the large undrawn balances especially as regards economic housing, may be put down mainly to slow progress on the part of the Capetown Municipality in carrying out its housing programme. The balances remaining to be provided out of the Government's commitment of £3,581,000 for economic housing and £500,000 for sub-economic housing work out at £420,000 and £361,000 respectively, towards which further instalments of £100,000 for each class of housing were made available for issue during the financial year 1933-34. The foregoing figures do not take into account repayments of capital falling available for re-issue which it is estimated will approximate £127,000 for the financial year 1933-34. From the commencement of the Act to 30th June, 1933, re-issues of repaid capital totalled £821,617.



The Department trusts that in areas where there is urgent need for carrying out housing reform measures, the local authority will take full advantage of the lower rates of interest and the slump in the building trade to push forward with suitable housing schemes so that not only will the shortage be overtaken to some extent, but also relief given to unemployment.

2. *Child and Maternal Welfare*.—Registration of births and deaths and infantile mortality rates for European infants in each Province during the past year and the preceding thirteen years are shown in table Q (i), whilst the maternal mortality rate for the whole Union, for 1932 and the preceding six years, is given in table Q (ii). The sharp rise in these rates for 1932 must be attributed almost entirely to increased poverty and malnutrition amongst large sections of the population, and lack of adequate medical and nursing attendance.



TABLE Q (i).—EUROPEAN INFANTS : BIRTHS AND DEATHS UNDER ONE YEAR REGISTERED AND INFANTILE MORTALITY RATE, I.E. DEATH RATE PER 1,000 BIRTHS, 1919-1932.

Year.	Cape.			Natal.			Transvaal.			Orange Free State.			Union.		
	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.
1919.....	16,749	1,351	80·66	2,910	191	65·64	15,338	1,326	86·45	4,727	382	80·81	39,724	3,250	81·81
1920.....	18,425	1,654	89·77	3,256	235	72·17	16,768	1,576	93·99	4,996	448	89·67	43,445	3,913	90·07
1921.....	18,062	1,382	76·51	3,370	203	60·24	16,582	1,374	82·86	5,288	379	71·67	43,302	3,338	77·09
1922.....	18,248	1,294	70·91	3,294	180	54·64	16·370	1,292	78·92	4,920	357	72·56	42,832	3,123	72·91
1923.....	18,296	1,353	73·95	3,229	197	61·01	15,619	1,261	80·74	5,037	328	65·12	42,181	3,139	74·42
1924.....	18,730	1,296	69·19	3,410	273	80·06	15,287	1,171	76·60	4,919	382	77·66	42,346	3,122	73·73
1925.....	18,366	1,343	73·12	3,509	206	58·71	16,348	1,059	64·78	5,188	361	69·58	43,411	2,969	68·39
1926.....	18,675	1,196	64·04	3,588	189	52·68	16,304	1,186	72·74	5,309	273	51·42	43,876	2,844	64·82
1927.....	18,537	1,293	69·75	3,435	166	48·32	17,050	1,359	79·71	5,325	314	58·97	44,347	3,132	70·63
1928.....	18,032	1,240	68·77	3,514	184	52·36	17,949	1,370	76·33	5,318	365	68·63	44,813	3,159	70·49
1929.....	19,008	1,169	61·50	3,650	177	48·49	18,227	1,342	73·63	5,334	280	52·49	46,219	2,968	64·22
1930.....	19,468	1,332	68·37	3,641	159	43·65	19,108	1,386	72·54	5,317	300	56·42	47,534	3,177	66·84
1931.....	19,180	1,182	61·63	3,538	162	45·79	18,733	1,267	67·65	4,975	317	63·72	46,423	2,928	63·07
1932*.....	18,410	1,216	66·05	3,397	200	59·09	18,441	1,424	77·22	4,927	263	53·38	45,175	3,103	68·69

\* Preliminary Figures.



TABLE Q (ii).—MATERNAL MORTALITY : EUROPEANS.

Year.	Live Births Registered.	Deaths due to Puerperal Causes.				
		Number.		Rates per 1,000 Live Births.		
		Puerperal Sepsis.	Other Puerperal Causes.	Puerperal Sepsis.	Other Puerperal Causes.	Total Puerperal Mortality.
1926.....	43,876	88	112	2.06	2.50	4.56
1927.....	44,347	101	112	2.28	2.53	4.81
1928.....	44,809	102	121	2.28	2.70	4.98
1929.....	46,219	140	103	3.03	2.23	5.25
1930.....	47,536	119	131	2.50	2.76	5.26
1931.....	46,423	116	102	2.50	2.20	4.70
1932.....	44,944	126	114	2.80	2.54	5.34

This is to be deplored, since these deaths are to a considerable extent preventable if adequate ante-natal and post-natal nursing and medical services are available. The desirability of providing such services has long been stressed by this Department. The Council of Public Health has dealt with the matter year after year, and has emphasised the urgency of appointing the necessary staff; thus in October, 1930, it passed the following resolution:—

“ In view of the present inadequate facilities for general and maternity nursing, especially in rural areas, and the high maternal death-rate for the Union, this Council considers that the matter calls for serious and urgent consideration of the Government and Parliament, with a view to devising effective remedial measures.”

At its meeting held last December, the Council resolved as follows:—

- “(a) This Council is of opinion that a system of district midwifery and nursing service throughout the Union is an urgent requirement;
- (b) That the control of such service should be the function of the Union Government, except in large Local Authority areas capable of maintaining such services themselves with the aid of grants from the Government;
- (c) As such service cannot, for financial and other reasons, be instituted at once, a commencement should be made in the more needy areas;
- (d) That before such a service is instituted, a woman medical officer, with special qualifications and experience, should be appointed to the Department.”

Public opinion has also become aroused. Increasing pressure has been brought to bear on the Government by the different women's organisations in South Africa for the appointment in this Department of a small staff specially to deal with the problem of ante-natal, maternal and infant welfare, with the object of reducing the mortality and morbidity that occur during and after child-birth. Latterly, the women's organisations have been demanding the creation of a small section in the Department to specialise on the problem—consisting of an Assistant Health Officer (preferably a woman medical practitioner), and three or four nurse-lecturers of the health visitor type. Such a section exists in the health organisations of most up-to-date countries; the best examples of their working are, perhaps, New Zealand, where the infantile mortality has been reduced to 34, and Scandinavian countries, where the maternal mortality has been reduced to about 2.5.

At a joint meeting of the Federale Kongres van A.C.V.V.; S.A.V.F.; O.V.V.; en N.C.V.V., held at Bloemfontein recently, a resolution was passed unanimously demanding the appointment by the Government of an Assistant Health Officer whose duties were to be entirely confined to organising a preventive service to reduce the maternal and infantile mortality in the Union.

It is therefore very gratifying to be able to announce that these various representations have borne fruit, and that a commencement is to be made during the coming year with the appointment of the necessary staff. The appointments to be made will be—a medical officer to inspect and advise local authorities on child and maternal welfare matters, and three itinerant nurse-lecturers to address gatherings of women and do other preventive work, with a view to educating particularly the poorer sections of the community in these matters.

Table Q (iii) sets out the causes of death of mothers during the past year; this table brings out very clearly the preventable nature of most of these deaths.

TABLE Q (iii).—EUROPEAN DEATHS FROM PUERPERAL CAUSES—1931 :  
(ACCORDING TO AGE PERIODS).

Causes.	All Ages.	15-20.	20-25.	25-30.	30-35.	35-40.	40-45.	45 and Over.
Abortion.....	6	—	—	2	—	2	2	—
Ectopic Gestation.....	3	—	—	1	1	1	—	—
Other Accidents of Pregnancy..	6	—	—	2	—	2	1	1
Puerperal Haemorrhage.....	33	1	2	3	10	10	4	3
Other Accidents of Labour....	17	1	3	3	3	4	3	—
Puerperal Septicaemia.....	116	7	23	30	21	22	11	2
Phlegmasia Alba Dolens, Embolus and Sudden Death....	4	—	—	1	—	2	1	—
Albuminuria and Convulsions...	19	2	5	4	4	3	1	—
Following Child-birth (N.O.D.)..	14	1	3	3	2	3	2	—
Puerperal Diseases of the Breast	—	—	—	—	—	—	—	—
	218	12	36	49	41	49	25	6

3. *Nursing and Maternity Homes.*—Notwithstanding the general depression and the fact that the average number of nursing homes that have closed, as compared with previous years, has not been exceeded, it would appear from the figures for the report year that this kind of institution has steadily come to be in greater demand than for some considerable time past. The totals shown in Table R (i) indicate that the number of nursing homes throughout the Union generally has increased, especially in the Cape and Transvaal Provinces where the larger urban centres such as Capetown and Johannesburg have contributed the major quota of newly established nursing homes. The position in this respect is a considerable improvement on previous years.

TABLE R. (i).—NURSING HOMES REGISTERED WITH THE DEPARTMENT.

Year.	Cape.	Transvaal.	Natal.	O.F.S.	Total.
1928-29.....	104	90	43	26	263
1929-30.....	124	91	54	29	298
1930-31.....	110	98	51	25	284
1931-32.....	95	94	44	26	259
1932-33.....	105	100	46	25	276

New registrations effected with the Department, including new and more suitable premises taken in occupation by old established nursing homes, total 46 for the year, while the actual number of homes closed or nursing home practices abandoned figure at 30. There are 5 nursing homes under yearly sanction of the Department pending such time as better facilities are available in the areas concerned, and one home has been closed by order of the Minister owing to the premises being unsuitable for nursing home purposes.

Inspections, for reasons referred to in the previous Report, leave much to be desired and activities in this direction are reflected in Table R (ii). The result has been that fewer nursing homes have been officially certified by the Department than in the previous year. Much, therefore, depends on the budgetary provisions of the Department in the near future as to whether adequate funds will be available for this important service to be carried out satisfactorily by its Assistant Health Officers. Inspections by Medical Officers of Health of local authorities also show a regrettable decrease.

TABLE R (ii).—NURSING AND MATERNITY HOMES : INSPECTIONS DURING THE  
YEAR ENDED 30TH JUNE, 1933.

Place.	Number Inspected.	
	By Medical Officer of Local Authority.	By Government Health Officer.
<i>Cape Province</i> —		
Capetown.....	8	—
East London.....	—	—
Port Elizabeth.....	7	—
Elsewhere.....	2	—
<i>Natal Province</i> —		
Durban.....	1	—
Pietermaritzburg.....	1	—
Elsewhere.....	2	—
<i>Transvaal Province</i> —		
Johannesburg.....	2	—
Pretoria.....	1	—
Elsewhere.....	2	14
<i>Orange Free State</i> —		
Bloemfontein.....	—	—
Elsewhere.....	1	1
UNION.....	27	15
TOTAL.....	42	



*Bed Accommodation.*—The fluctuations in the number of registered nursing homes occasioned by removals from and additions to the departmental register are not very marked. As the two factors about counter-balance one another, the following figures showing the bed accommodation available in nursing institutions throughout the Union are an indication of the extent to which these facilities are being used by the urban and rural populations in the various Provinces:—

TABLE R (iii).—BED ACCOMMODATION AVAILABLE IN NURSING HOMES.

CAPE PROVINCE.		No. of Beds.	Total.
<i>Larger Urban Areas:</i>			
Capetown and Peninsula.....		512	
East London.....		69	
Port Elizabeth.....		145	
Queenstown.....		60	
		<hr/>	
		786	
<i>Rural Areas.....</i>		278	
		<hr/>	1,064
TRANSVAAL PROVINCE.			
<i>Larger Urban Areas:</i>			
Johannesburg.....		635	
Other Rand Municipalities.....		181	
Pretoria and surroundings.....		127	
		<hr/>	
		943	
<i>Rural Areas.....</i>		101	
		<hr/>	1,044
NATAL PROVINCE.			
<i>Larger Urban Areas:</i>			
Durban.....		498	
Pietermaritzburg.....		93	
		<hr/>	
		591	
<i>Rural Areas.....</i>		453	
		<hr/>	1,044
ORANGE FREE STATE PROVINCE.			
<i>Urban Area:</i>			
Bloemfontein.....		70	
<i>Rural Areas.....</i>		110	
		<hr/>	180
TOTAL FOR THE UNION.....			<hr/>
			3,332
			<hr/>

Many nursing homes provide bed accommodation also for Asiatics, Coloured people and Natives, especially in Cape and Natal areas where these populations are numerous.

4. *General Hospitals.*—The system of annual inspection on behalf of the Provincial Administration of the State-aided hospitals and kindred institutions in the Cape Province, Orange Free State and the Transvaal was continued during the year. As before, the hospitals on the Reef and in Pretoria were inspected by the Members of the Public Hospitals Advisory Council, while twenty-one hospitals and aided charitable institutions were inspected and reported on by different assistant health officers of this Department as opportunity arose. Owing to a shortage of staff and the necessity of reducing travelling to a minimum it was found impracticable to inspect all the institutions during the year. The remaining institutions will, however, be inspected in the near future and under existing circumstances each institution will probably be inspected at least once in every two years. It is satisfactory to note that progress is still being made towards meeting the shortage of hospital accommodation and generally improving conditions of the institutions under the control of the Cape and the Orange Free State Provincial Administrations.

In the Cape Province a commencement has been made with the new Central Hospital at Capetown and during the year the new Frere Hospital at East London was completed and occupied.

In the Orange Free State the new Central Hospital at Bloemfontein was completed and occupied. With regard to the remaining Hospitals in this Province the position remains practically unchanged.

In the Transvaal Province the scheme for extensive additions and alterations to the Johannesburg General Hospital is still under the consideration of the Provincial Administration. The scheme for the establishment of a hospital at Volksrust appears to have made no further progress.

The hospitals in the Natal Province are not inspected by the medical officers of this Department, but as far as is known there is practically no change in the Hospital position in this Province. It is understood that the scheme for erecting a new non-European hospital at Congella is still in process of preparation.

*Chronic Sick Hospitals.*—The very unsatisfactory position in regard to chronic sick hospitals in the Union was commented upon in previous reports and the position remains practically unchanged.

The Transvaal Provincial Administration has, however, prepared a scheme for the re-building and enlargement of the chronic sick hospital at Rietfontein and it is hoped that this scheme will materialise in the near future.

5. *Habit-forming Drugs.*—The enforcement of the regulations regarding opium, dagga and other habit-forming drugs continues to be carried out. This is done in co-operation with the Police, Commissioner of Customs and Excise and Postmaster-General. The following table shows the prosecutions and convictions :—

TABLE S.—SHOWING PROSECUTIONS AND CONVICTIONS UNDER LAWS RELATING TO HABIT-FORMING DRUGS DURING THE PERIOD 1ST JULY, 1932 TO 30TH JUNE, 1933.

Province.	European.		Native.		Asiatic.		Other Coloured.		Total.	
	Pro-secu-tions.	Con-vic-tions.	Pro-secu-tions.	Con-vic-tions.	Pro-secu-tions.	Con-vic-tions.	Pro-secu-tions.	Con-vic-tions.	Pro-secu-tions.	Con-vic-tions.
Cape.....	32	27	936	877	15	10	935	913	1,918	1,827
Natal.....	6	6	1,593	1,546	54	51	38	35	1,691	1,638
Transvaal.....	54	50	1,943	1,842	31	26	203	198	2,231	2,116
O.F.S.....	10	9	247	235	—	—	33	33	290	277
UNION.....	102	92	4,719	4,500	100	87	1,209	1,179	6,130	5,858

Of the total of 6,130 prosecutions, 6,115 were in respect of dagga and 15 of opium ; 3 lb. 3½ oz. of opium and large quantities of dagga were seized and confiscated.

The total quantities of habit-forming drugs imported into the Union during the year ended 30th June, 1933, were : Opium, 692 lb. 520 gr. ; morphine, 65 lb. 2,958 gr. ; cocaine, 44 lb. 555 gr. ; heroin, 15 lb. 2,179 gr. ; *Cannabis indica*, 9 lb. 3,489 gr. ; and Coca leaves, 1 lb. 1,946 gr.

The following habit-forming drugs were exported from the Union during the year ended 30th June, 1933 : Opium, 25 lb. 2,220 gr. ; morphine, 1 lb. 4,982 gr. ; cocaine, 2,081 gr. ; heroin, 469 gr. ; *Cannabis indica*, 875 gr.

The permit for the cultivation of dagga for export purposes issued to a farmer in the Koster area, Rustenburg District, Transvaal, was renewed for the calendar year 1933.

Apart from dagga-smoking by natives and coloured persons and opium-smoking by a few Chinese addicts, the illicit use of habit-forming drugs in the Union is comparatively trifling.

Two hundred and forty-four registers of habit-forming drugs kept by chemists and druggists were inspected in various large centres in the Union.

Every chemist and druggist or other person who ordinarily stocks habit-forming drugs is required in terms of Chapter 6 of Act No. 13 of 1928, to keep a register properly named and reflecting the quantity of the drug possessed, imported, or acquired by him ; the date of importation or acquisition of the drug ; the person from whom and the place from which the drug was imported or acquired ; the quantities sold, supplied, used or administered, the purpose for which used, and the date of use, or the name and address of the person to whom sold, supplied or administered, and the date thereof. In the many instances where the registers were found not to be properly kept, warning notices were issued and generally proved sufficient to ensure compliance with the legal requirements.

Act No. 13 of 1928 makes it definitely illegal for a practitioner to prescribe a habit-forming drug to an addict to satisfy a craving for the drug. Medical practitioners may of course prescribe habit-forming drugs for a definite curative or therapeutic purpose, but not to satisfy a craving, and no chemist may make more than two issues on the same prescription or order. Every order or prescription must contain the name and address of the person for whom the drug is required or prescribed and the name, address and qualification of the person signing such order or prescription. During recent inspections of chemists' registers it became evident that some medical practitioners were not complying with the requirements of the law through ignorance of its provisions or through carelessness. The co-operation of the Medical Association of South Africa has been sought in advising its members of the requirements of the law.



6. *Anaesthetics*.—In last year's report attention was drawn to the heavy death-rate in the Union in connection with anaesthetics. The following table furnishes the figures supplied by the larger hospitals in the Union for the year 1932 :—

Anaesthetic.	Number of Operations.	Deaths on Table due to—					Per 1,000 Anaesthetics.
		Anaesthetic.	Anaesthetic and Shock.	Operation while Moribund.	Surgical Accident.	Total.	
Ethyl Chloride and Ether	8,138	2	4	7	—	13	1·60
Chloroform and Ether..	11,447	3	6	4	1	14	1·22
Gas and Oxygen.....	776	1	1	1	—	3	3·87
Ether.....	555	—	1	5	—	6	10·81
Chloroform.....	784	—	2	—	—	2	2·55
Spinal.....	361	—	2	—	—	2	5·54
Local.....	7,633	—	1	1	—	2	0·26
Ethyl Chloride.....	2,471	—	—	—	—	—	—
Avertin.....	430	—	—	—	—	—	—
Not specified.....	866	—	—	—	—	—	—
	33,461	6	17	18	1	42	1·26

From this table it will be observed that the mortality during 1932 was 1·26 per 1,000 anaesthetics. It was 1·90 during the preceding two years. Although the mortality during 1932 shows an improvement, a serious view of the position is taken by the Department, and arrangements have been made for collecting detailed information of every death connected with an anaesthetic as it occurs, with a view to the possibility of measures being introduced which may tend to lessen the mortality. A questionnaire has been drawn up for the guidance of Medical Superintendents in submitting a report on each death, and when sufficient data have been collected it is proposed to appoint a committee of experts to investigate the whole subject of anaesthesia under South African conditions. Some exception has been taken to the length of the questionnaire, but if an investigation by experts is to be undertaken later, it will be essential for its success that the most detailed information possible should be recorded. The form of questionnaire was drawn up in consultation with expert anaesthetists and pharmacists, and it is earnestly hoped that hospital authorities generally will assist by causing the information asked for to be supplied to the Department. Arrangements have also been made to have the anaesthetic used in each case analysed free of charge to the hospital, when considered necessary. It will be obvious, however, that it will be a matter of two or three years before sufficient information is collected to enable a proper examination into the whole subject to be made.

The following is a summary of the deaths connected with operations performed in the main hospitals of the Union during the last three years :—

Anaesthetic.	Number of Operations.	Deaths on Table due to—					Per 1,000 Anaesthetics.
		Anaesthetic.	Anaesthetic and Shock.	Operation while Moribund.	Surgical Accident.	Total.	
Ethyl Chloride and Ether	30,383	16	27	26	—	69	2·27
Chloroform and Ether...	46,997	22	23	21	1	67	1·43
Gas and Oxygen.....	1,735	1	2	3	—	6	3·46
Ether.....	3,793	—	4	20	—	24	6·33
Chloroform.....	2,020	4	2	1	—	7	3·47
Spinal.....	999	—	3	2	—	5	5·01
Local.....	17,897	—	1	4	—	5	0·28
Ethyl Chloride.....	6,318	2	1	3	—	6	0·95
Avertin.....	505	—	—	—	—	—	—
Not specified.....	1,032	—	1	1	—	2	1·94
	111,679	45	64	81	1	191	1·71

It is impossible to arrive at any definite conclusion from these figures by themselves, but the classification assigned in some instances by the hospital authorities is at least open to doubt. For instance, the number of deaths shown as having occurred during operations on moribund patients include two on patients who were being operated on for the removal of tonsils. Such patients, at least, are not usually rushed into hospital as a last resort, and the deaths should probably have been assigned to one of the other columns of the table. Further, the statistics recorded for the different anaesthetics are vitiated somewhat by the fact that in the case of 1,032 operations with two deaths, the exact anaesthetics used have not been recorded by the hospital authorities. Nevertheless, it is considered that the figures furnished indicate the need for the proposed investigation.



## 7. AERIAL INLAND AMBULANCES.

A good few lives might be saved annually if some provision could be made for the maintenance of an Aerial Ambulance Service in South Africa. Such an Ambulance stationed at the Capetown Air Port, another at the Rand Air Port and a third stationed at Kimberley would serve all the sparsely populated areas of the Union.

The Australian Inland Mission has maintained an Aerial Medical Service for several years past, which operates in the West of Queensland and in the East of the Northern Territory. The expenditure for the year ended 30th June, 1932, on this service was approximately £2,850. The service has been subsidised to the extent of about £1,000 per annum from the Federal or State Governments, but during the depression in Australia the Pilot has run in addition an air-mail each weekend so that the service recently has been available only for four and a half days per week. Approximately one half of the expenditure on this service consists of a doctor's salary and the cost of maintaining a wireless service. The need in South Africa is not so great perhaps for flying doctors, and owing to the development of post offices, telegraph and telephone lines in the Union it is not thought that expenditure on wireless stations would be required.

But the provision of Aerial Ambulances would add very materially to the facilities for the treatment of patients in outlying places who require urgent hospital treatment. An Aerial Ambulance has been used on occasions in the past by the Defence Department in connection with the Military Hospital at Roberts Heights, but so far they have not been introduced for the use of civil hospitals. Patients who have been transported by aerial ambulances state that they are far more comfortable than any form of road ambulance.

## VII.—CONCLUSION.

The Department is greatly indebted to Col. P. G. Stock, C.B., C.B.E., of the staff of the Ministry of Health, Whitehall, for continuing to act as its official representative on the International Health Office at Paris, and as its unofficial liaison officer with the Ministry of Health in London. The excellent reports he has furnished on all subjects dealt with at the former office during the year and on any other matter on which the Department desired information as to British procedure have indeed been valued.

The South African Medical Council and the South African Pharmacy Board have been consulted by the Department freely during the year and my thanks are due to the Presidents and members of these bodies and to their able Registrar—Mr. E. Herbert—for their ready assistance at all times in connection with matters on which their advice was solicited.

The Department owes much also to the Director and staff of the South African Institute for Medical Research for guidance on many technical questions and to the Board of the Institute for the establishment and maintenance of the Malaria Research Station at Tzaneen and to Dr. B. de Meillon, the Entomologist attached to the Station, for his splendid work in connection with the vectors of Malaria and for his cordial co-operation generally with the officers of the Department.

The Federal Council of the Medical Association of South Africa is in close contact with the Head of the Department and the latter consequently has been greatly helped in his work by a knowledge of the views of the Association. And in connection with the solution of purely local problems the assistance of the Branch Councils of the Association has been much appreciated.

Complaints by the public against District Surgeons have been less frequent. The majority of them have been due to misunderstandings on the part of the public in regard to the nature of the contracts of service and not to infringements of the terms of service. Generally it may be said that the Government is fortunate indeed in having in its employ as District Surgeons so many hard working and conscientious men. My thanks are due to them and to the District Surgeons Association for their co-operation during the past year. It is to be hoped that with the dawn of better times it may become possible for the State to recognise more adequately the great services District Surgeons render to the community. It is the very essence of a District Surgeons contract that if his work increases to any great extent his emoluments should be reassessed accordingly. But as already pointed out during the past few years there has been a huge increase in pauper work thrown upon District Surgeons and sufficient provision could not be obtained on the estimates of the Department to enable any but the most trifling salary adjustments to be made. Complaints by District Surgeons have nevertheless been relatively few as they have appreciated the difficulties of the Government and have carried on in a spirit of self-sacrifice hoping that sooner or later the Department would be enabled to secure the financial sanctions to make the salary adjustments that it recognises are long overdue.

Several of the officers of the Department took long leave overseas during the year and after they had left two of the senior members of the professional staff unfortunately contracted serious illnesses which placed exceptional strain on those that remained available in the Union. I feel that I cannot conclude this report without expressing my grateful thanks to all members of the professional, administrative and clerical staff who assisted me in enabling the Department to cope adequately with its responsibilities during the period. Without exception all have done good work.

I have finally to record my indebtedness to Dr. E. H. Cluver who has assisted me in the preparation of this Report.

I have the honour to be,

Sir,

Your obedient Servant,

E. N. THORNTON,

Department of Public Health,  
Pretoria, 20th September, 1933.

*Secretary for Public Health and Chief Health Officer.*



CHART OF DEPARTMENT OF PUBLIC HEALTH as at 30th June, 1935.

**Minister (Chairman.)**  
Secretary and Chief Health Officer (Deputy Chairman).  
Mrs. S. B. Broers.  
Messrs. W. J. O'Brien, M.P., and L. C. Serrurier.  
Drs. C. Porter, K. Bremer, M.P., H. J. Steyn, and Sir S. Lister.

Secretary and Chief Health Officer (Chairman),  
Sir Spencer Lister.  
Professors A. W. Falconer and W. H. Craih,  
Drs. A. Piper, F. C. Willmot, G. W. Robertson,  
stein, K. Bremer, M.P., and G. Park Ross.

*Secretary and Chief Health Officer (Sir E. N. Thornton).†*

1 Senior Assistant Health Officer  
1 Chief Clerk  
(C. N. Millard).  
1 Accountant  
(L. J. Hatch).  
*Under Secretary* (A. DE V. BRUNT).  
2  
(A. Sturges)

### Sections.

Assistant Health Officers (Detached).	Inspection and Field Staff.	Pathological Laboratories.	Port Health Officers.	District Surgeons.	Housing.	Leprosy Institutions.	Veneral Diseases Hospitals.	Malaria.	Tuberculosists.	Epidemic and Infectious Diseases (Plague, Typhus, Smallpox, etc.), and Vaccination.	Food and Drugs Adulteration; Habit-forming Drugs.	Local Authorities.	Other Bodies.
<p>Capetown : F. C. Willmot)</p> <p>Simonstown : G. A. Park Ross and Dr. L. Fourie)</p> <p>Port Elizabeth : E. H. Cluver)</p>	<p>Two Assistant Health Officers : (Drs. A. J. van der Spuy and F. W. P. Cluver).</p> <p>Five Inspectors (4 plague and 1 typhus).</p>	<p>Capetown, and Vaccine Institute, Rosebank : (Dr. W. F. Rhodes; Dr. R. H. Mackintosh, assistant).</p> <p>Durban : (Dr. B. Sampson), *South African Institute for Medical Research, Johannesburg.</p>	<p>Capetown : (Dr. J. M. Bosman).</p> <p>Durban : G. A. Bachelor).</p> <p>Port Elizabeth : (Dr. H. W. A. Kay).</p> <p>East London : (Dr. R. V. S. Stevenson).</p> <p>Simonstown : (Dr. A. B. Bull).</p> <p>Knysna : (Dr. J. D. Allen).</p> <p>Mossel Bay : (Dr. F. T. Waldron).</p> <p>Port St. Johns : (Dr. G. H. Meiring).</p>	<p>8 Whole-time. 3 Part-time. 312 Total.</p> <p>==</p>	<p>Central Board—Sir E. N. Thornton (Chairman), Sir J. G. van Boeschoten, Messrs. F. W. Jameson, J. L. Hall, R. S. Gordon (Member &amp; Secretary)</p>	<p>Pretoria : (Drs. J. du Pré le Roux, H. J. F. Wood, H. v. R. Mostert and J. C. Coetzee).</p> <p>Kimberley : (Dr. J. A. Macdonald, and Dr. A. R. Davison).</p> <p>Mkambati : (H. C. Bellew and Dr. F. S. Drewe).</p> <p>Amatikhulu : (F. J. Roach and Dr. G. D. Stoute).</p> <p>Bochem : (J. H. Franz and Dr. C. P. Andrew).</p>	<p>Rietfontein, Johannesburg : (Dr. J. Daneel).</p> <p>Kingwilliamstown : *Bochem.</p> <p>*Ellim.</p> <p>*Jane Furse Memorial.</p> <p>Several smaller hospitals.</p>	<p>Medical Inspector : (Dr. D. H. S. Annecke).</p> <p>Inspectors and Assistants.</p>	<p>Nelspoort Sanatorium : (Dr. P. Allan).</p> <p>*Holy Cross Medical Mission.</p>	<p>Field Staff. District Surgeons. Local Authorities. Magistrates, etc.</p>	<p>Inspectors, Customs, Police, etc. Chemical work done in chemical laboratories of Department of Agriculture at Capetown &amp; Johannesburg.</p>	<p>227 Municipalities. 94 Village Management Boards. 38 Local Boards. 31 Village Councils. 52 Health Committees. 7 Local Administrations and Health Boards. 94 Divisional Councils. 1 Health Board. 148 Magistrates. 5 Mining Commissioners.</p> <p>— Total. 697 —</p>	<p>South African Medical Council. South African Pharmacy Board. Rand Water Board.</p>

\* Receives Grant-in-Aid.

† Is also Director of Medical Services (Defence).

## ANNEXURE B.

*Pamphlets and Leaflets published by Department of Public Health :—*

- “ Senecio Disease.” (Warning Notice.) No. 166 (Health).
- “ Food and Health.” No. 194 (Health).
- “ Anthrax.” No. 239 (Health).
- “ Venereal Diseases : Their Prevention and Treatment.” No. 248 (Health).
- “ Instructions to Persons suffering from Gonorrhoea.” No. 249 (Health).
- “ Instructions to Persons suffering from Syphilis.” No. 250 (Health).
- “ Poisoning by ‘ Stinkblaar ’ or Thorn Apple (*Datura stramonium* and *Datura tatula*).” (Warning Notice.) No. 256 (Health).
- “ Sleeping Sickness.” (Warning Notice.) No. 262 (Health).
- “ Smallpox : Duties and Powers of Local Authorities under Public Health Act, and procedure to be followed in dealing with outbreaks.” No. 276 (Health).
- “ Directions for the Performance of Public Vaccination.” No. 279 (Health).
- “ Dagga Smoking and its Evils.” No. 289 (Health).
- “ Plague : A Brief Account of its Symptoms, Clinical Diagnosis, Morbid Anatomy and Treatment.” (Drs. D. C. Rees and J. A. Mitchell.) No. 293 (Health).
- “ Plague : Its Control, Eradication and Prevention.” No. 316 (Health).
- “ Plague and its Cause and Prevention.” No. 317 (Health).
- “ Rodents : Description, Habits, and Methods of Destruction.” (W. Powell.) No. 321 (Health).
- “ Fly-proof Latrines for Coloured Persons.” (Dr. G. A. Park Ross.) No. 334 (Health).
- “ Houseflies : Their Life-history, Destruction, and Prevention, and their Influence on Sanitation and Health.” No. 335 (Health).
- “ Bilharzia (Human Redwater) Disease.” No. 339 (Health).
- “ Snake-bite and its Treatment.” No. 348 (Health).
- “ First Measures in Malarial Prevention for Farmers and Settlers.” (Drs. G. G. Hay and G. A. Park Ross.) Published jointly with the South African Red Cross Society (Transvaal.) No. 356 (Health).
- “ Instructions to Native Patients suffering from Syphilis or Gonorrhoea.” (In Zulu, Sixosa, Sesuto, and Sechuana.) No. 358 (Health).
- “ Influenza.” No. 363 (Health).
- “ Typhoid or Enteric Fever : Its Causes, Spread and Prevention in South Africa.” No. 365 (Health).
- “ Care of the Teeth and Prevention of Dental Disease in Children.” No. 368 (Health).
- “ Leprosy in the Transkei.” No. 372 (Health).
- “ Catechism about Typhoid or Enteric Fever.” No. 378 (Health).
- “ The Teeth : How to Prevent Decay.” No. 379 (Health).
- “ Plague Danger in Cape and South-Western Districts : Measures and Procedure in Event of Outbreak.” No. 380 (Health).
- “ The Cause and Prevention of Simple Goitre.” No. 394 (Health).
- “ Typhus or Louse Fever.” No. 417 (Health).
- “ Consumption, its Causes, Prevention and Treatment.” No. 439 (Health).
- “ Malaria Catechism for use in Schools.” No. 360 (Health).
- “ Life History of the Malaria Parasite.” No. 464 (Health).
- “ Directions for the Prevention and Treatment of Malaria and Blackwater Fever.” No. 198 (Health).
- “ Malaria Control by Anti-Mosquito (Adult) Measures.” No. 465 (Health).
- “ The Control of Malaria by Larvicidal Methods.” No. 435 (Health).



# ANNEXURE C.

TABLE 1.—PORTS OF THE UNION: HEALTH MEASURES DURING THE YEAR ENDED 30TH JUNE, 1933.

Particulars.	Capetown.	Durban.	Port Elizabeth.	East London.	Mossel Bay.	Knysna.	Port St. Johns.	Simonstown.	Port Nolloth.	Total.
Vessels dealt with.....	923	1,151	694	546	207	13	18	68	56	3,676
Cases of infectious or communicable diseases dealt with.....	284	752	—	—	—	—	—	—	—	1,036
No. of Vessels involved.....	72	58	—	—	—	—	—	—	—	130
Disinfections—										
Vessels.....	19	5	—	—	—	—	—	—	—	24
Consignments second-hand clothing and other articles.....	23	41*	14	—	—	—	—	—	—	78
Bales of mixed articles.....	—	—	—	—	—	—	—	—	—	—
Deratizations under International Sanitary Convention—										
No. of Vessels Deratized and Certificates Issued	1	54	—	—	—	—	—	—	—	55
No. of Exemption Certificates Issued.....	12	27	—	—	—	—	—	—	—	9
Rats Destroyed on Vessels and on Shore.....	2,819	2,120	1,866	550	1,280	—	—	—	—	8,635

\* In addition, the personal effects of 1,366 Indian passengers were disinfected.

## ANNEXURE D.

## SOUTH AFRICAN INSTITUTE FOR MEDICAL RESEARCH.

## MALARIA RESEARCH STATION, TZANEEN.—RESEARCH ACTIVITIES.

DISTRIBUTION OF *A. GAMBIAE* AND *A. FUNESTUS*.1. *A. funestus*.

This species breeds in the permanent streams which have their origin in the Drakensberg and is therefore independent of local rainfall. Its numbers show a seasonal fluctuation which is entirely dependent on temperature. *A. funestus* population is, therefore, a stable one and this is well reflected by the intensity of malaria in regions where this species predominates as well as by the absence of epidemics.

It has been found that at about 2,500 feet the habits of *funestus* change. Below this altitude the insect is almost solely a house frequenter. Out of 1,015 specimens, for example, 15 were captured in anything but human habitations. Such areas are characterized by intense malaria. Beyond this altitude and up to 3,500 feet larvae are still numerous, but adults no longer enter habitations and malaria is absent.

The factors limiting the distribution of the house-frequentering race of *funestus* have been determined as follows:—

- (1) An annual rainfall of not less than 30 inches except where, as often happens, an area of low rainfall immediately adjoins one of high rainfall.
- (2) A mean temperature of not less than 61° F.
- (3) A range of temperature of not more than 40° F.

2. *A. gambiae*.

In direct contrast to *funestus* this insect, because of its preference for small pools of a temporary nature, shows fluctuations in numbers which are not only seasonal, but also intra-seasonal due to the distribution of local rains. There is also an annual fluctuation due to abnormal temperatures prevailing over areas which are normally unsuitable for this species.

## SEASONAL FLUCTUATION.

When, in the winter, temperatures become unsuitable, the insect is confined to breeding-grounds which are defined as follows:—

- (1) Altitude below 2,000 feet.
- (2) Presence of breeding-places, usually pools in large rivers.
- (3) Absence of frost.
- (4) Range of temperature of less than 40° F.
- (5) Mean temperature of not less than 61° F.

The above factors include a larger area in summer than in winter so that the insect has two distinct seasonal distributions.

## INTRA-SEASONAL FLUCTUATION.

In spite of the fact that the above factors may be prevailing *gambiae* may be restricted to rivers if no rains have fallen to enable it to spread into the waterless country so typical of the areas lying between the rivers of the Western and Northern Transvaal. It may, therefore, show a fluctuation from summer to summer according to whether rains are general or not.

## ANNUAL FLUCTUATION.

It is possible that summers may come in which the limiting factors may have a wider range. Should such an event take place *gambiae* would then occur in areas from which it may have been absent for years. This, we believe, although owing to the lack of meteorological data we are not certain, happened in the Rustenburg district during the epidemic of 1928. *Gambiae* was absent from this district in 1926, present in enormous numbers in 1928, and absent in 1931 when the first search was made for it again since 1928. This fluctuation also depends on widespread rainfall or the insect would only be confined to rivers.

It will be seen how these fluctuations lend themselves to the production of epidemics, especially annual fluctuation. Practical experience bears this out and has shown that in South Africa epidemics of malaria are always associated with *gambiae*.

Epidemics due to intra-seasonal fluctuation are usually local in distribution since widespread rains over the whole of the Western and Northern Transvaal are rare events. Such epidemics are not of a very serious nature since the inhabitants subject to yearly visitations of the disease have attained a certain degree of anti-parasitic immunity and have some knowledge of the therapy. These epidemics are rarely accompanied by deaths.

Epidemics due to annual fluctuation are much more of a danger since they visit people, the majority of whom have no previous experience of the disease, possess no anti-parasitic immunity, do not know the first principles of malaria therapy and in Rustenburg in 1928 were found to be suspicious of quinine even when the majority of them were ill and could find no other relief. Deaths are not an uncommon feature of these epidemics.



MICROCLIMATIC FEATURES OF *gambiae* AND *funestus*.*The Immature Stage.*

These two insects often occur in the same areas and may even inhabit the same stream, *funestus* being confined to shaded portions where there is a current and *gambiae* to exposed, quiet backwaters. They are, therefore, subject to the same general climatic factors. Investigation of the respective spots in the stream actually occupied by them reveal the fact that they are really exposed to very different temperatures, as the following will show :—

· Range of temperature, *funestus* breeding-place,  $51\frac{1}{2}^{\circ}$  F.

Range of temperature, *gambiae* breeding-place,  $42^{\circ}$  F.

On one occasion when a temperature of  $34^{\circ}$  F. was recorded in a small pool such as is favoured by *gambiae* the *funestus* breeding-place yielded a temperature of  $56^{\circ}$  F. This will explain the disappearance of *gambiae* from areas where *funestus* may exist throughout a winter.

The intense heat generated in a small pool, e.g.  $103^{\circ}$  F. would suggest that the larva of *gambiae* may show a relatively higher resistance to high temperatures than *funestus* which, owing to the more equable climate of a stream, is not called upon to do so. This was proved experimentally as follows :—

Species.	Number.	Temperature.	Exposure.	Number Alive After 24 Hours.
<i>Gambiae</i>	15	$113^{\circ}$ F.	1 hour	15
<i>Funestus</i>	15	$113^{\circ}$ F.	1 hour	None.

These were first-stage larvae of known age.

The nature of *gambiae* breeding-places would suggest that eggs of this species might show a relatively greater resistance to desiccation than *funestus*. This was also shown to be true as follows :—

Species.	Number Eggs.	Temperature.	Period of Desiccation.	Number Hatched.	Control.
<i>Gambiae</i>	100	Room	105 hours	Large numbers two days later	Hatched.
<i>Funestus</i>	100	"	"	None	"
<i>Funestus</i>	80	"	93 hours	About 20 per cent.	"
<i>Gambiae</i>	50	$95^{\circ}$ F.	24 hours	About 50 per cent.	"
<i>Funestus</i>	50	$95^{\circ}$ F.	24 hours	None	"

The idea that larvae of *gambiae* can resist desiccation in dried mud for months and then suddenly appear with the rains is a very prevalent one among some authorities in this country. We hope that the following will eventually dispose of this misleading opinion :—

Temperature.	Medium.	Length of Life.
Room	Damp blotting paper	6 days.
Room	Damp mud	5 days.
Room	Drying mud	1 day.

If under the most ideal conditions of humidity and temperature larvae could only live for 6 days, what hope have they of surviving when exposed to the intense heat, as much as  $109^{\circ}$  F., of drying mud.

Pupae were found capable of hatching in wet mud with no supernatant fluid at room temperature, but failed to do so when the temperature was raised to  $109^{\circ}$  F.

## THE ADULT.

*Tropisms Influencing the Gravid gambiae Female.*

By exposing an iron tray with rain water next to some natural pools it was found that temperature alone was not the only factor which induced the female to deposit her eggs. When earth was added to the tray, eggs were deposited, but larvae failed to mature. An analysis of the micro-funa and flora\* content before and after addition of earth showed that the latter corresponded more in kind though not in bulk to the natural pool. The water in the tray before addition of earth was practically devoid of micro-organisms. This seems to point to the fact that the female is guided by the presence of certain organisms in the water and not by temperature alone. It is not suggested that these two factors, namely food and temperature, are the only guides, we believe the problem to be much more complicated as was found by Buxton when investigating *Aedes* in Polynesia.

\* Kindly carried out by Miss Stephens of the Capetown University to whom our thanks are due.

Natural rain water pools eight days old were found to be very rich in micro-organisms both animal and vegetable, suitable for larvac, whereas artificial collections of some age were practically devoid of such material. This offers an explanation of the rapid appearance of *gambiae* larvae in the former so soon after rains.

Haunts of the Adult.

Various workers have shown that temperatures of over 100° F. are fatal to the adult mosquito. Our own experience in this direction may be summed up as follows :—

Temperature.		Length of Life.
95° F.....		21-45 hours.
104° F.....		1 -4 hours.
113° F.....		10 minutes.

Since these temperatures are by no means uncommon in malarious areas it might seem strange that the insect should be able to survive and malaria persist. We have shown, however, that *funestus* is mainly a house frequenter, accordingly it is really the temperature inside the habitation which the insect is exposed to. We found that in one instance a hut inhabited by *funestus* was 6° F. cooler than the atmosphere, that it may even be more than this we do not doubt.

By watching the behaviour of *funestus* on the wall of an iron-roofed hut which attained very high temperatures we found the following interesting movements of the insect during approximately 48 hours.

Date.	Time.	Temperature.		Position of Adults.
		Near Floor.	Near Roof.	
11.1.32..	2.30 p.m.....	92	102	Near floor and actually on floor.
„ ..	3.45 p.m.....	93	104	Near floor and actually on floor.
12.1.32..	6 a.m.....	71	70	Near roof.
„ ..	8 a.m.....	84	84	Near roof.
„ ..	10 a.m.....	90	97	Some near roof, some near floor, majority midway.
„ ..	12 a.m.....	94	102	One near roof, rest on floor.
„ ..	2 p.m.....	96	107	On or near floor only.
„ ..	4 p.m.....	96	106	On floor only.

This shows the sensitiveness of the insect to temperature and the methods it employs to avoid them.

In winter, too, when on one or two occasions frost occurred at a spot where adults of *funestus* nevertheless persisted, we found that the hut in which they roosted actually had a minimum temperature of 45° F.

*Gambiae* in contrast to *funestus* is not a house frequenter to the same degree, but it is often found roosting under damp stones, in crevices and hollows. The following facts relate to the climatic conditions in one such roosting place as compared with the conditions obtaining outside :—

	TIME.													
	6.30 a.m.		8 a.m.		3 p.m.		7 p.m.		9 p.m.		1.30 a.m.		6.30 a.m.	
	RH %	T°F.	RH %	T°F.	RH %	T°F.	RH %	T°F.	RH %	T°F.	RH %	T°F.	RH %	T°F.
Open Air....	66	59.5	51	68	19	93	35	75.5	40	72	46	66	58	61.5
Crevice.....	64	68	74	72.5	45	84.5	50	82	57	78	63	73.5	60	68

Here it will be seen how much more favourable the crevice is. It has less range of temperature with a higher minimum and lower maximum and is also relatively more moist.

The ordinary climatological factors as measured in a Stevenson screen are therefore of little assistance when attempting to unravel the bionomics of the insect.

Funestus AND ITS RELATION TO THE HUMAN HABITATION.

1. Length of Stay in a Habitation.

By examining the stage of egg development in insects leaving and entering human habitations we found that *funestus* enters a habitation with undeveloped eggs and leaves only when these are fully developed. It is usually assumed from Christopher's work in India, that it takes five days for eggs to develop fully. We, unfortunately, have been unable to gather any facts relative to this. We may take it for granted, however, that some days do elapse before eggs are fully developed and knowing that the insect remains indoors all this time and therefore has opportunities for repeated feeds on the



inmates we have an explanation of the fact instanced by Swellengrebel, Annecke, and De Meillon, that *funestus* shows an extraordinary high infection rate when compared with the relatively low-gametocyte rate of the host.

## 2. *Effect of Artificial Light.*

It was found that lights of five candle power did not have any effect on the numbers of insects which enter, but that a light of 300 candle power definitely kept them out of a room.

## 3. *Distance of Flight.*

An adult survey showed that adults, both male and female, may occur as far as two miles from their point of origin, but that 80 per cent. of adults occur within the half-mile radius. We were unable to estimate the importance from a practical point of view of the 20 per cent. which occur outside the half-mile limit. We also have a record of a flight of four-and-a-half-miles when no nearer source of human blood was available.

## 4. *Endophily.*

Experiments showed that *funestus* prefers to bite its host when the latter is confined in an enclosed space. A host sleeping out in the open under a trap net was not visited by any adults.

## 5. *Repellants and Culicifuges.*

Citronella oil when thoroughly applied over the whole body did not render immunity from bites for longer than five hours. Spraying a hut with insecticide at 8 p.m. did not prevent adults from entering early in the morning. The value of those measures is, therefore, dependent on the knowledge that they have their limitations. We stress this point because it is so often believed that a single application of citronella or a single spraying with a culicifuge is sufficient to last throughout the night.

(Signed) B. DE MEILLON,  
*Entomologist to the Institute.*

# ANNEXURE E.

TABLE 2.—PUBLIC VACCINATIONS DURING THE YEAR ENDED 30TH JUNE, 1933.

Province.	Number of Centres at which Public Vaccinations were held.		Numbers Vaccinated.				
			Europeans.		Non-Europeans.		Total.
	Urban.	Rural.	Primary.	Re-Vaccination.	Primary.	Re-Vaccination.	
Cape.....	206	1,582	11,143	1,412	97,956	63,857	174,368
Transvaal.....	93	434	11,477	1,720	58,843	83,606	155,646
Natal.....	48	269	1,008	735	21,910	1,394	25,047
Orange Free State	66	260	5,302	195	14,190	707	20,394
TOTAL.....	413	2,545	28,930	4,062	192,899	149,564	375,455

ANNEXURE E.—(continued).

TABLE 3.—VACCINATION OF INFANTS AND CHILDREN IN THE CLASSES OF THE POPULATION WHICH REGISTER BIRTHS, YEAR ENDED 30TH JUNE, 1933.  
(These figures do not include Re-vaccination of the 12-year old Children.)

Particulars.	Cape.		Transvaal.		Natal.			Orange Free State.	Union.
	Cape District.	Remainder of Province.	Rand Area.	Remainder of Province.	Durban.	Pietermaritzburg.	Remainder of Province.		
Births Entered in Vaccination Register.....	12,103	30,261	9,348	10,403	2,264	643	1,584	4,749	71,355
Successfully Vaccinated.....	4,467	2,475	2,029	4,154	864	305	839	3,309	18,442
Insusceptible to Vaccination.....	11	—	61	55	40	7	5	31	210
Vaccination Postponed owing to Illness.....	179	115	217	261	192	44	198	874	2,080
Previously had Smallpox.....	3	—	—	—	—	—	—	—	3
Deaths of Infants under Two Years Registered.....	2991	2,756	752	624	150	25	134	290	7,722
Exempted under Section 10, Act No. 15 of 1928.....	31	50	96	92	141	18	50	68	546
Ratio Percentage of Vaccinations Registered to Births Registered during the Year (after allowing for deaths of infants under two years).....	49.0	9.0	23.6	42.5	40.9	49.4	57.9	74.2	29.0



## ANNEXURE E—(continued).

TABLE 4.—RE-VACCINATION OF TWELVE-YEAR-OLD EUROPEAN CHILDREN IN NATAL,  
YEAR ENDED 30TH JUNE, 1933.

Particulars.	Durban.	Pieter-maritzburg.	Remainder of Province.	Total.
Registration of twelve-year-old European children.....	1,289	416	1,462	3,167
Successfully vaccinated.....	491	223	548	1,262
Insusceptible to vaccination.....	44	11	57	112
Vaccination postponed owing to illness....	31	7	29	67
Previously had smallpox.....	—	—	—	—
Ratio percentage of vaccinations to twelve-year-old registrations.....	43·91	57·93	43·37	45·5